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ELECTROENCEPHALOGRAPHIC RESPONSE TO OVERVENTILATION AND ITS RELATION TO AGE

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AN EXTRAORDINARY change in the electrical activity of the cortex can be produced in some persons if the carbon dioxide content of the blood is lowered by overventilating the lungs.[1] The change consists in an increase in the amplitude of the "brain waves" and a decrease in their frequency. This response is seen most often and in its most extreme form in subjects with epilepsy, particularly those with petit mal type.[2] Among normal children, however, a great sensitivity to overventilation is common.[3, 4, 5] It is less common in old than in young adults.[6]

Obviously, if such a response is to be given clinical significance, an adjustment must be made for age, but up to the present time no data have been available on which to base such an adjustment. For this reason, some workers have not included overventilation as part of the electroencephalographic examination. We have used it because, although other types of seizure pattern are rarely produced by overventilation, the three-per-second wave and spike pattern of petit mal is usually precipitated by this procedure.[7] Seventy-seven per cent of all patients with a clinical diagnosis of petit mal epilepsy show without overventilation the characteristic three-per-second wave and spike pattern, but with overventilation an additional 8 per cent that would otherwise be missed show this discharge. On the other hand, overventilation produces wave and spike discharges in only a very small fraction of the supposedly nonepileptic population; such discharges were seen in 0.5 per cent of 2,281 normal control subjects and in 0.2 per cent of 4,533 patients with some central nervous disorder unrelated to epilepsy.[8]

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The wave and spike pattern of petit mal is a specific seizure discharge; it is abnormal at any age and should not be confused with the increase in amplitude and slowing that occurs rather commonly in response to overventilation in normal persons. The purpose of the present report is to show the incidence of a given response at various ages, and since both epileptic and normal subjects are considered, its clinical significance can be estimated.

MATERIAL AND METHOD

The total number of persons studied was 3,388; of these, 2,281 were normal control subjects and 1,107 were epileptic patients. In all cases, monopolar three- or six-channel electroencephalograms were recorded from the frontal, parietal, and occipital areas with an indifferent electrode on the ear lobes.

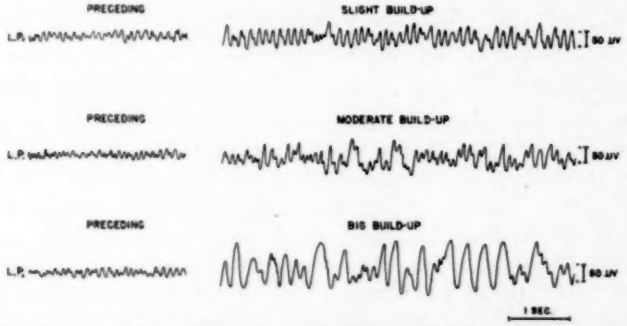

Fig. 1.—Three cases illustrating different degrees of electroencephalographic response to overventilation. L. P., left parietal lead (indifferent electrode on the ear lobes). The strips of record labelled *preceding* were obtained prior to ovenventilation: those labelled *slight, moderate,* and *big build-up* were obtained at the end of two minutes of overventilation. Vertical lines at the right-hand margin indicate the deflection made by a 50-microvolt signal and the horizontal line at the lower right indicates the distance traversed by the record in one second.

Overventilation was carried out at a rate of approximately fifty deep breaths per minute for two minutes unless a maximal electroencephalographic response was obtained in a shorter time. Instructions were given during the overventilation in order to produce as nearly as possible a standard performance. Only patients in whom the overventilation was considered satisfactory were included in the present report. The electroencephalographic response to overventilation is referred to as a *build-up* because it is characterized by an increase in amplitude but slowing of the frequency is an important feature. Build-ups were classified as *slight, medium,* and *big;* examples are shown in Fig. 1. Subjects were seated. Big build-ups are more readily obtained in the sitting than in the lying position.

By using a spirometer or some type of meter, it might be possible to obtain a more perfectly standardized overventilation than that attained in this study. However, after some experimentation, it was found that the necessary mouthpiece, tubing, valves, meter, and cir-

culating pumps cause anxiety in young subjects, and, in adults, interfere with the normal performance of this essentially simple task. It was decided, therefore, that such encumbrances destroyed the usefulness of the procedure as a routine clinical test.

Davis and Wallace[9] have suggested that because the electroencephalographic response to overventilation varies with the blood sugar level this "level must be controlled if hyperventilation is to be standardized as a test for stability of the electroencephalogram." In our opinion, such precautions are unnecessary clinical studies. Experimental evidence will be published later to support this view but the internal consistency of the present data indicates that important relationships between overventilation and the electroencephalogram are observable in spite of spontaneous and uncontrolled variations in the blood sugar level.

RESULTS

The incidence of each of the three types of build-up in different age groups is given in Tables I and II. Curves showing the incidence of a big build-up in the records of epileptic patients and in normal subjects are plotted in Fig. 2. In all ages the proportion with a big build-up is

TABLE I

RESPONSE OF NORMAL CONTROL SUBJECTS IN DIFFERENT AGE GROUPS TO OVERVENTILATION

AGE (YR.)	TYPE OF BUILD-UP									
	BIG		MODERATE		SLIGHT		NONE		TOTAL	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
3 to 5	12	70	4	23	1	7	0	0	17	100
6 to 10	12	50	8	33	1	4	3	13	24	100
11 to 15	35	23	30	20	27	18	58	39	150	100
16 to 20	44	13	40	11	59	17	209	59	352	100
21 to 25	91	8	92	8	175	15	784	69	1,142	100
26 to 30	12	7	17	9	24	13	132	71	185	100
31 to 35	4	4	9	9	8	8	79	79	100	100
36 to 40	3	5	3	5	7	11	53	79	66	100
41 to 45	1	2	3	7	2	5	37	86	43	100
46 to 50	0	0	2	6	1	3	31	91	34	100
51 to 55	0	0	0	0	3	11	24	89	27	100
56 to 60	1	3	0	0	3	10	25	87	29	100
61+	1	1	1	1	5	5	105	93	112	100
Total	216	10	209	9	316	13	1,540	68	2,281	100

greater in patients with epilepsy than in normal subjects. In both groups the incidence of persons with a big build-up decreases rapidly with increasing years until the age of 30 years. The difference in the height of these two curves indicates the ages at which an excessive response to overventilation is most likely to be present in epileptic patients as compared with normal subjects. This difference is plotted in Fig. 3. The greatest differences occur during the years of adolescence, the least after the age of 30 years. From 60 years of age on, the incidence of big build-ups appears to rise slightly, but in the older age groups the number of patients is too small for the results to be reliable.

TABLE II

RESPONSE OF EPILEPTIC PATIENTS IN DIFFERENT AGE GROUPS TO OVERVENTILATION

AGE (YR.)	TYPE OF BUILD-UP									
	BIG		MODERATE		SLIGHT		NONE		TOTAL	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
3 to 5	30	97	1	3	0	0	0	0	31	100
6 to 10	88	87	9	9	2	2	2	2	101	100
11 to 15	111	71	23	15	8	5	14	9	156	100
16 to 20	107	55	29	15	16	8	44	22	196	100
21 to 25	69	45	30	19	16	10	40	26	155	100
26 to 30	49	41	19	16	16	13	36	30	120	100
31 to 35	13	15	11	13	13	15	48	57	85	100
36 to 40	8	9	12	14	11	13	55	64	86	100
41 to 45	7	11	11	17	9	13	39	59	66	100
46 to 50	4	12	4	12	7	20	19	56	34	100
51 to 55	2	6	3	9	7	22	20	63	32	100
56 to 60	2	8	2	8	8	32	13	52	25	100
61+	2	10	3	15	1	5	14	70	20	100
Total	492	45	157	14	114	10	344	31	1,107	100

TABLE III

INCIDENCE OF DIFFERENT DEGREES OF RESPONSE TO OVERVENTILATION AMONG CASES WITH VARIOUS TYPES OF ELECTROENCEPHALOGRAM

ELECTRO-ENCEPH-ALOGRAM CLASSIFICATION	TYPE OF BUILD-UP									
	NONE		SLIGHT		MODERATE		BIG		TOTAL	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
Paroxysmal	1	13	0	0	1	13	6	74	8	100
S-2*	2	22	1	11	2	22	4	45	9	100
S-1†	24	23	22	21	25	24	33	32	104	100
8½	6	35	5	29	3	18	3	18	17	100
9	55	73	8	11	6	8	6	8	75	100
9½	129	82	16	10	9	6	4	2	158	100
10	178	82	23	11	9	4	6	3	216	100
10½	142	86	16	10	5	3	2	1	165	100
L.V.F.‡	79	77	16	15	5	5	3	3	103	100
11	79	73	17	16	8	7	5	4	109	100
11½	37	65	13	23	4	7	3	5	57	100
12	22	50	16	36	3	7	3	7	44	100
F-1§	29	40	22	30	11	15	11	15	73	100
F-2‖	1	25	0	0	1	25	2	50	4	100
Total	784	69	175	15	92	8	91	8	1,142	100

*Very slow.
†Slightly slow.
‡Low voltage fast.
§Slightly fast.
‖Very fast.

When the resting electroencephalograms of 1,000 adult control subjects are classified into fourteen categories based primarily on the frequency of the dominant rhythm,[8] a simple distribution curve is obtained (Fig. 4). The extreme categories shown in black are considered abnormal. Epileptic patients have a bimodal distribution with peaks in the black categories.[8] Table III and Fig. 5 show the percentage incidence of each type of build-up in each of the fourteen categories; these data are based on 1,142 normal adults. From Table III and Fig. 5 it

is obvious that a big build-up following overventilation is dependent not only on the age of the person, but also on the type of his prehyperpnea record. Our data agree with Davis' statement,[10] that in normal control subjects big build-ups occur most commonly in those whose resting electroencephalograms are abnormal.

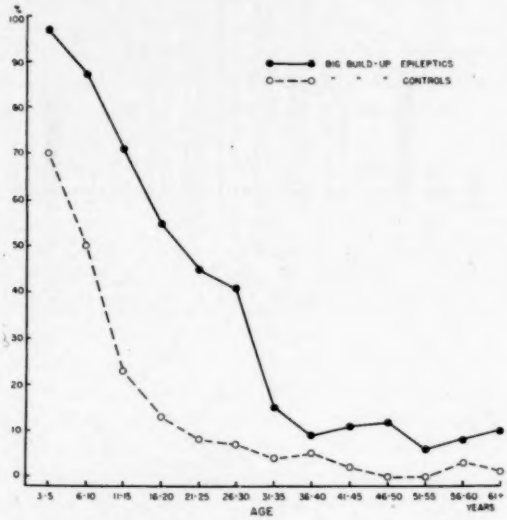

Fig. 2.—Per cent of normal control subjects and epileptic patients in a given age group, showing a big build-up with overventilation. This figure should be read as follows: Ninety-seven per cent of the three- to five-year-old epileptic patients had a big build-up with overventilation; 70 per cent of the three- to five-year-old normal control subjects had a big build-up.

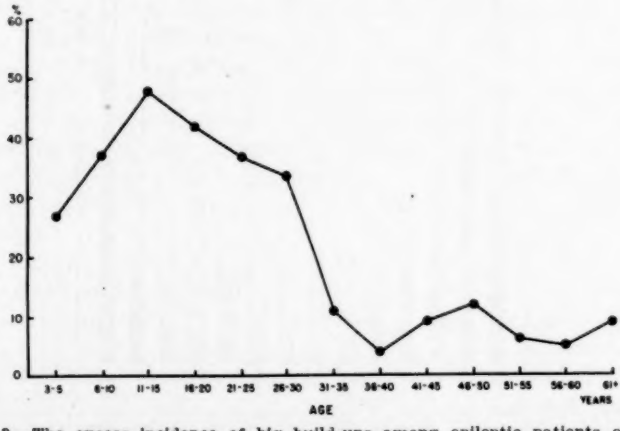

Fig. 3.—The excess incidence of big build-ups among epileptic patients as compared with normal subjects in various age groups. This figure should be read as follows: Big build-ups were 27 per cent more common among epileptic patients in the three- to five-year-old group than among normal control subjects of the same age.

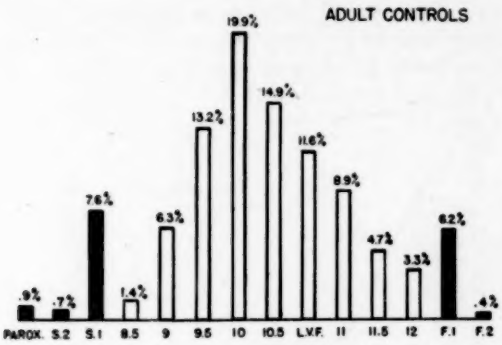

Fig. 4.—The percentage distribution of the electroencephalograms of 1,000 adult control subjects in terms of a classification based on differences in wave pattern and frequency. *Parox.*, paroxysmal, that is, manifesting discharges of the type that occur during epileptic seizures; *S-2*, very slow; *S-1*, slightly slow; *8.5*, *9*, *9.5*, etc., manifesting no significant features other than a dominant rhythm of the frequency indicated in cycles per second; *L.V.F.*, low voltage fast; *F-1*, slightly fast; *F-2*, very fast.

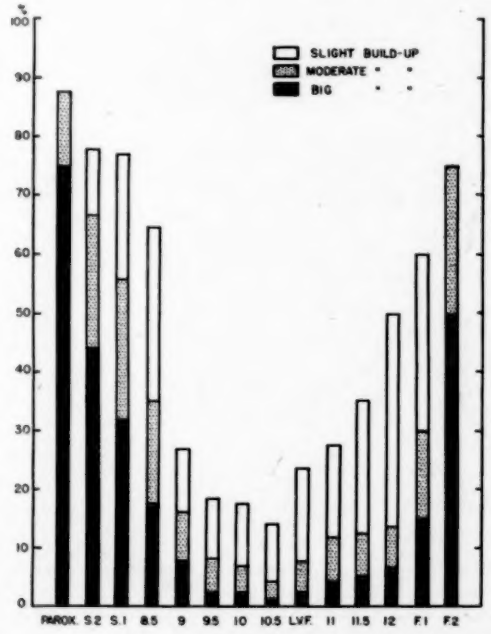

Fig. 5.—Percentage incidence of different degrees of response to overventilation among 1,142 adult control subjects classified according to the type of the preoverventilation electroencephalogram. Abbreviations are the same as in Fig. 4.

DISCUSSION

Since overventilation tends to slow the electrical activity of the cortex and since in children the electrical activity of the cortex is normally slower than in adults,[11, 12] it may not seem surprising that overventilation and immaturity tend to supplement each other, so that in children the response to overventilation is, in general, greater than adults. However, the recognition of a consistent interrelation between the frequency of cortical activity, age, and overventilation cannot be considered an explanation, for no one of these factors is simple enough or sufficiently understood to suggest the nature of the causal linkages.

Previous work has shown that the amplitude and frequency of the electrical activity of the cortex are, to some extent, dependent on the cerebral carbon dioxide level and that the cerebral carbon dioxide level in healthy adults is relatively independent of the arterial carbon dioxide level.[13] This indepence is chiefly the result of the changes in the caliber of the cerebral blood vessels that occur with changes in the carbon dioxide level. With a fall in carbon dioxide tension, the cerebral blood vessels constrict, and with an elevation of arterial carbon dioxide the cerebral blood vessels dilate. In consequence, when a normal adult overventilates, even though the arterial carbon dioxide level is greatly reduced, the cerebral carbon dioxide level remains relatively unchanged.[14] Whether this cerebral vasomotor response matures slowly and is relatively incompetent in children is not known. If so, the declining incidence of big build-ups with increase of age would be easily explained. However, it is possible that the cerebral blood vessels of the child and the adult constrict equally well but that in young children the standard amount of overventilation produces a much greater fall in the arterial carbon dioxide level. Still another explanation is possible—the drop in arterial carbon dioxide and the constriction of the cerebral vessels may be the same in both children and adults, but the child's brain may be more sensitive than the adult's to a decrease in the cerebral carbon dioxide level. Studies are now in progress which may shed light on these problems, but whatever the final explanation, it is at present obvious that the capacity to maintain the normal electrical activity of the cortex during overventilation is a type of central nervous homeostasis which is clinically important, for it correlates with susceptibility to epilepsy.

In the general population the incidence of persons with a first seizure and among epileptic patients the annual number of seizures decreases with increasing age.[15] These decreases parallel roughly the decreasing incidence of big build-ups shown in Fig. 2. Persons who continue to have seizures must differ in some way from the normal (i.e., from those who do not). The age at which the difference is most commonly encountered should be the most common age of onset for "epilepsy." The curve for age of onset of clinical epilepsy is highest in the first four years and has a secondary peak at adolescence.[16] Thus, it has one

of the features of the curve for difference in the incidence of big build-ups between epileptic patients and control subjects (Fig. 3), but it has a high point in infancy as is shown in Fig. 2. Such similarities are not a proof of a relationship between response to overventilation and the underlying pathologic physiology of epilepsy, but they are in accord with the general evidence for such a relationship.[17, 18, 19]

The present report has not considered the effect of low sugar on the electroencephalogram except to deny that it is necessary to control the blood sugar level in order to obtain valid clinical data with overventilation. It is important, however, to point out that there is an extraordinary *parallelism* between the electroencephalographic response to overventilation and the response to low sugar. We have reported that petit mal seizure discharges which are easily precipitated by overventilation are also easily precipitated by lowering the blood sugar,[20] and Pauline Davis has reported that adult control subjects who show an increase in amplitude and slowing with overventilation tend to show a similar response with a moderate lowering of the blood sugar level.[10]

SUMMARY AND CONCLUSIONS

The electroencephalograms of 2,281 normal control subjects and of 1,107 epileptic patients have been studied with reference to the increase in amplitude and the decrease in frequency of brain waves which occurs with 100 deep breaths. This response is referred to as a *build-up.* A maximum response to overventilation is called a *big build-up;* it is most common in persons whose electroencephalograms are abnormal. In both normal subjects and those with epilepsy, the incidence of a big build-up falls abruptly with increasing age until the thirty-fifth year, after which the decline is negligible. The incidence of big build-ups in patients with epilepsy is greater than in the normal group in all ages, but this difference is greatest during adolescence. The decreasing frequency of big build-ups with increasing age is in agreement with observations that other abnormalities of the electroencephalogram as well as seizures themselves tend to improve as the person reaches maturity. In regard to both seizures and cerebral dysrhythmia, time is on the side of the patient with epilepsy.

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NUTRITION STUDIES DURING PREGNANCY

IV. Relation of Protein Content of Mother's Diet During Pregnancy to Birth Length, Birth Weight, and Condition of Infant at Birth

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THIS paper is one of a series dealing with the importance of diet during pregnancy to both the mother and her infant. The group studied and the methods employed are described in detail in the introductory article of the series.[1] The same 216 mothers and their infants are considered here.

Of the various nutritional essentials necessary for growth, protein is of great importance. During growth not only is there an increase in the amount needed, but also the quality of the protein in the diet is important in order that those amino acids essential for growth are present in necessary amounts. Despite these well-known facts and the fact that pregnancy, especially the last two trimesters, is a period of rapid growth and development, it has not been customary for many obstetricians to stress the importance of an increase in the amount of protein in the diet of the pregnant woman.

Slonaker[2] studied the effect of different percentages of protein in the diets of six generations of rats in order to observe the efficiency of various levels of protein intake upon reproduction and the growth and development of the offspring. He concluded that the best results were obtained with protein constituting approximately 14 per cent of the total calories of the diet. In his conclusions he states that a study of the history of mankind convinces one that races of tall stature and most perfect physique have lived on well-balanced diets rich in protein, with meat and other animal products forming a conspicuous part. Human balance studies of Macy and her co-workers[3] have shown that during the latter part of pregnancy the maternal organism stores nitrogen in excess of that going into the developing fetus. Coons and Blunt[4] and Macy and Hunscher[6] found that nitrogen retention was highest when the mother's diet was well supplied with animal protein. Coons, Macy, and others[5, 6, 7] have also studied the nitrogen retention in the fetus at each lunar month of pregnancy. From these studies it

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The material presented was collected as a part of the research program undertaken by the Department of Child Hygiene of the Harvard School of Public Health at its Center for Research in Child Health and Development. The work of the Center was made possible in part by a grant from the General Education Board of the Rockefeller Foundation. The nutrition studies have been supported in part by a grant from the Forsyth Dental Infirmary for Children, Boston. The Director of the Center for Research in Child Health and Development is Dr. Harold C. Stuart, Assistant Professor of Pediatrics and Child Hygiene, School of Public Health and School of Medicine, Harvard University.

has been estimated that a protein requirement of approximately from 845 to 900 Gm. above maintenance is necessary as representative of the total net requirement for the fetus and accessory structures during the gestation period. These workers have also shown that under favorable circumstances the woman retains in her own body in addition from 200 to 400 Gm. of nitrogen. Additional protein (from 1,250 to 2,500 Gm.) would have to be furnished by the mother's diet during pregnancy for this purpose. These requirements would mean an increase during the last six months of pregnancy of approximately from 10 to 20 Gm. of protein above the woman's normal daily requirement. Although these metabolic studies indicate the need for a high protein intake in the latter trimesters, little seems to be known about the effect of different protein levels on the outcome of pregnancy.

In the study made of the relationship existing between the mother's diet (mean general rating) during pregnancy and the condition of the infant at birth and during the first two weeks of life,[1] one of us was impressed with the wide range of protein intake found in the diets of the women studied. By grouping the diets of the 216 women according to their average protein content during the latter part of pregnancy, the effect of different levels of protein intake during this period upon the condition of the infants at birth has been studied.

TABLE I

STANDARDS USED FOR RATING PROTEIN IN MOTHER'S DIET DURING PREGNANCY (FOURTH THROUGH NINTH MONTH)

DIETARY RATING FOR PROTEIN	PROTEIN (GM.)	NUMBER OF CASES	PER CENT OF CASES
Excellent	85 or more	22	10
Good	70 to 84	47	22
Fair	55 to 69	66	30
Poor	45 to 54	51	24
Very poor	Under 45	30	14

The average daily protein content of each of the diets has been estimated in grams. Table I shows the standards used in rating the protein intakes of the mothers and the number and the percentage of women whose diets during the latter part of pregnancy fell into each of these classifications. According to these standards only 10 per cent of the women had diets which could be considered "excellent"* in protein, while approximately 70 per cent consumed diets which were "fair" or below in this important nutritional essential.

The birth lengths† of the infants were studied in relation to the average number of grams of protein in the mothers' diets during pregnancy (Fig. 1). A significant relationship was found to exist between the protein content of the mother's diet during the latter part of

*Eighty-five grams of protein are recommended by the Food and Nutrition Board of the National Research Council as desirable in the latter part of pregnancy.

†The crown-heel length of the infant was measured to the nearest 0.1 cm. by two examiners.[5, 9]

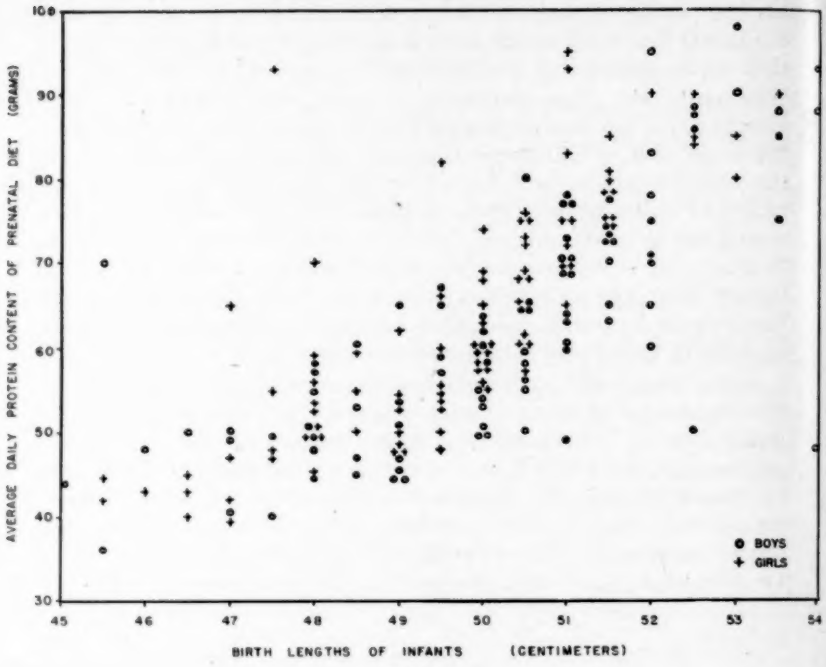

Fig. 1.

pregnancy and the birth length of her infant. This relationship is shown in Table II.

Because an actual difference in length and weight exists at birth between male and female infants, the length and weight of each infant was expressed in percentile range. The percentile norms in length and weight for the *entire* series of full-term infants studied at the Center[9] are given in Table III.

TABLE II

RELATIONSHIP OF PROTEIN CONTENT OF MOTHER'S DIET TO BIRTH LENGTH* OF INFANT

AVERAGE DAILY PROTEIN CONTENT OF PRENATAL DIET		BOYS		GIRLS	
RATING	GRAMS	NUMBER OF INFANTS	MEAN LENGTH AT BIRTH (CM.)	NUMBER OF INFANTS	MEAN LENGTH AT BIRTH (CM.)
Excellent	85 or more	10	53.3	10	52.0
Good	70 to 84	21	51.4	22	51.0
Fair	55 to 69	29	50.3	32	49.9
Poor	45 to 54	25	49.3	21	48.7
Very poor	Under 45	7	47.4	8	46.6
Total		92		93	

*Only lengths taken within the first three days after birth were used.

TABLE III

PERCENTILE NORMS IN LENGTH AND WEIGHT OF ENTIRE SERIES OF FULL-TERM INFANTS STUDIED

PERCENTILE	10TH	25TH	50TH	75TH	90TH	NUMBER OF INFANTS
Birth Length in Centimeters						
Boys	48.1	49.3	50.6	52.0	53.3	88
Girls	47.8	49.0	50.2	51.0	51.9	99
Birth Weight in Pounds and Ounces						
Boys	6, 5	6, 15	7, 8	8, 5	9, 1	136
Girls	6, 4	6, 15	7, 7	8, 2	8, 10	145

The use of the percentile range makes it possible to disregard sex and to include nine more infants* in the distribution according to percentile length at birth. The average number of grams of protein in the diets of the mothers of all infants in each percentile range in length is shown in Table IV. From a study of the material it would seem that the range of from 70 to 84 Gm. used in the rating of "good" total protein was too wide and that the lower limit of the range of "good" protein should be 75 Gm.

TABLE IV

TOTAL PROTEIN IN DIETS DURING PREGNANCY OF MOTHERS OF INFANTS IN EACH PERCENTILE GROUPING OF BIRTH LENGTH

PERCENTILE LENGTH AT BIRTH	AVERAGE TOTAL PROTEIN (GM.) DAILY (FOURTH THROUGH NINTH MONTH)	NUMBER OF INFANTS
90th and over	88	14
75th to 90th	79	31
50th to 75th	67	49
25th to 50th	57	39
10th to 25th	52	28
0 to 10th	48	33
Total		194

Since heredity is usually included as one of the major determining factors of height, consideration was given to the heights of the parents of these infants. The heights of both parents are known in the case of only 138 of these infants. Using these data, a correlation coefficient of $+.28 \pm .08$ was found to exist between the father's height and the baby's length and a similar relationship between the mother's height and the birth length of the infant, namely, $+.27 \pm .08$, was obtained.

Of the 216 infants there are 194 whose birth lengths can be placed within a percentile range. The relationship of the heights of their mothers and the average number of grams of total protein in the prenatal diets to the birth lengths of the infants were studied. This information is shown in Table V. It is apparent that the amount of protein in the mother's diet has a greater effect on the infant's length than does the mother's height. The decrease in height with decreasing

*Nine infants were measured later than the third day after birth and at that time were found to be below the tenth percentile in length. These cases, while not included in the distribution of lengths by actual measurements, have been included in the grouping by percentile range.

TABLE V

AVERAGE PERCENTILE BIRTH LENGTHS OF INFANTS IN RELATION TO TOTAL PROTEIN IN PRENATAL DIET AND MOTHER'S HEIGHT

AVERAGE TOTAL DAILY PROTEIN (GM.)	MOTHER'S HEIGHT			NUMBER OF CASES
	TALL (5 FEET, 5 INCHES AND OVER)	AVERAGE (5 FEET, 2 INCHES TO 5 FEET, 4 INCHES)	SHORT (5 FEET, 1 INCH AND UNDER)	
75 or more	87	80	73	45
55 to 74	47	53	50	80
Under 55	18	17	25	69
Total	56	82	56	194

protein is very obvious, whereas in the middle and low protein groups the baby's length seems to decrease as mother's height increases.

From the standpoint of practical nutrition, one can conclude that a diet well supplied with foods rich in protein tends to produce a long baby, while a diet poorly supplied would in all probability result in a relatively short baby irrespective of mother's height. The correlation between length and total protein is $+.80 \pm .03$, and, with the effect of mother's height removed, the partial correlation between baby's length and amount of total protein in the mother's diet in the latter trimesters of pregnancy is about the same ($+.78 \pm .03$).

In view of this marked relationship between the birth length of the infant and the total number of grams of protein in the prenatal diet, the question arises, does protein from one source in the mother's diet influence this effect more than protein from another source? An attempt was made to divide the grams of total protein in each case into grams of protein from animal sources, namely from milk, cheese, meat, poultry, fish, and eggs, and the number of grams from nonanimal sources. The number of grams of protein supplied by milk or cheese was separated in each case and subtracted from the total number of grams of protein furnished from all animal sources, thus giving a figure representing the protein furnished by meat, fish, eggs, etc. (all animal sources except milk and cheese). The correlation coefficient of baby's length at birth with each of these protein groups was calculated.* These coefficients are given in Table VI.

The average number of grams of protein furnished by each protein group or combination of groups in the diets of all mothers of infants in each percentile range is given in Table VII.

*Miss Jane Worcester of the Department of Vital Statistics, Harvard School of Public Health, computed the coefficients of the equation which predicts the percentile position in length of a given child from the amounts of protein from the various sources. Because the three kinds of protein are measured in the same units, namely grams, the relative size of the coefficients in the equation should show the importance of the different sources of protein to the length of the child. The equation figures out to be:

Percentile position in length = 1.68 animal protein (minus milk protein) + .96 milk protein + 1.86 nonanimal protein − 49.62.

The group of children from which this equation is figured is quite large (194), with the result that the standard errors of the coefficients are small. The coefficient for milk protein (.96) is significantly lower than the other two.

TABLE VI

CORRELATION COEFFICIENTS OF BABY'S LENGTH WITH PROTEIN IN DIET DURING PREGNANCY

PROTEIN (GM.)	CORRELATION COEFFICIENT*	STANDARD ERROR
Total	+.80	±.03
Animal	+.68	±.04
Animal (milk and cheese excluded)	+.69	±.04
Milk	+.32	±.06
Nonanimal	+.50†	±.05
Milk + nonanimal	+.55	±.05
Animal (milk and cheese excluded) + nonanimal	+.76	±.03

*194 cases were used.

†In considering this figure, the reader must remember that this is nonanimal protein functioning in a diet containing varying amounts of total protein, with animal protein averaging 74 per cent of this total. This relationship is undoubtedly high due to the supplementary effect of the animal protein.

TABLE VII

PRENATAL PROTEIN* FOR PERCENTILE GROUPING OF BIRTH LENGTHS

BIRTH LENGTH PERCENTILE	AVERAGE DAILY PROTEIN (GM.)						
	TOTAL	ANIMAL	ANIMAL (− MILK AND CHEESE)	MILK	NON-ANIMAL	MILK AND NON-ANIMAL	ANIMAL (− MILK AND CHEESE)+ NON-ANIMAL
90th or above	88	64	38	27	22	48	59
75th to 90th	79	58	35	24	21	45	55
50th to 75th	67	50	27	23	18	41	44
25th to 50th	57	41	21	21	16	36	37
10th to 25th	52	37	19	19	16	33	34
Below 10	48	36	18	20	13	33	30

*These means were computed on grouped data (one figure used for each group) and so do not add exactly in all cases.

In considering the relationships obtained between protein in the diet of the mother and baby's length, the question arises, can one be sure that it is the protein in the foods rather than some other nutritional factor or factors associated with protein in these same foods? We know that the foods largely responsible for the total protein in these diets, namely, meat, eggs, milk, cheese, fish, etc., and the nonanimal sources, chiefly cereal grains, carry many other nutritional essentials, some in relatively large amounts. The possibility of calcium or riboflavin being a primary controlling factor in this relationship seems remote, assuming that the correlation coefficient for milk protein is relatively low, and milk is a very rich source of these two factors. Since each ounce of milk furnishes 1 Gm. of protein, a similar correlation coefficient for either of these nutritional factors would be obtained, namely, approximately +.32±.06, with birth length. It would seem correct to assume that the amount of total protein in the prenatal diet is a more influential factor in determining the birth length of the infant than either calcium or riboflavin. The protein-rich foods are also the phosphorus-rich foods, and the two essentials are so closely

associated in food that in a dietary study such as this it is difficult to determine the effect of phosphorus. In the amounts of various animal protein foods usually consumed in the diets of these women, a greater proportion of the phosphorus comes from milk than from meat, eggs, etc. If we assume that the correlation coefficient of birth length with milk protein was lower than with animal protein (milk protein excluded), it would seem that the effect was coming from the amino acids in the protein rather than from the phosphorus in the diet, for if phosphorus was responsible, the reverse would have been expected. Average daily caloric intakes have been studied in relation to birth length, and it appears that protein is more important than caloric intake in this respect. This will be dealt with in detail in subsequent papers. At far as the thiamine content of the prenatal diet is concerned, our estimates may be less reliable, as it is more difficult to obtain an accurate picture of thiamine intake from a dietary history. From our data a correlation coefficient of $+.39 \pm .06$ was obtained between the thiamine content of the prenatal diet and the birth length of the infant. If our estimates of thiamine are in error, our distribution curve would indicate that we have underestimated rather than overestimated the thiamine content of these women's diets. Niacin may also be a factor, since meat makes up a considerable portion of the figure for total protein. We have made no attempt to rate the niacin content of these diets. However, from the standpoint of simple everyday foods, it is clear that if protein is not the key factor, as we are inclined to believe, other factors which may be important in this respect appear to be well taken care of if the prenatal diet is well supplied with protein-rich foods.

Consideration was given to the birth weights of infants in relation to the average number of grams of protein in the mothers' diets during the latter months of pregnancy (Fig. 2). This distribution shows an increase in birth weight with each additional 10 Gm. of protein in the prenatal diet. The male infants were found to be somewhat heavier than the female infants for any given amount of protein in the mother's diet during pregnancy. These data are shown in Table VIII along with the increase in average birth length which was also found with each additional 10 Gm. of protein in the prenatal diet.

We have shown that babies whose mothers' diets have been well supplied with protein have greater birth lengths and weights. It remains to determine whether with this increase in length and weight there is also an increase in the well-being of the infant. That better physical development of the infant results when the mother's diet is well supplied with essential structural foods which are rich in protein is shown by a study of the birth lengths and weights in relation to the pediatric ratings at birth. Since both birth lengths and weights show significant relationships to the amount of protein in the mother's diet during

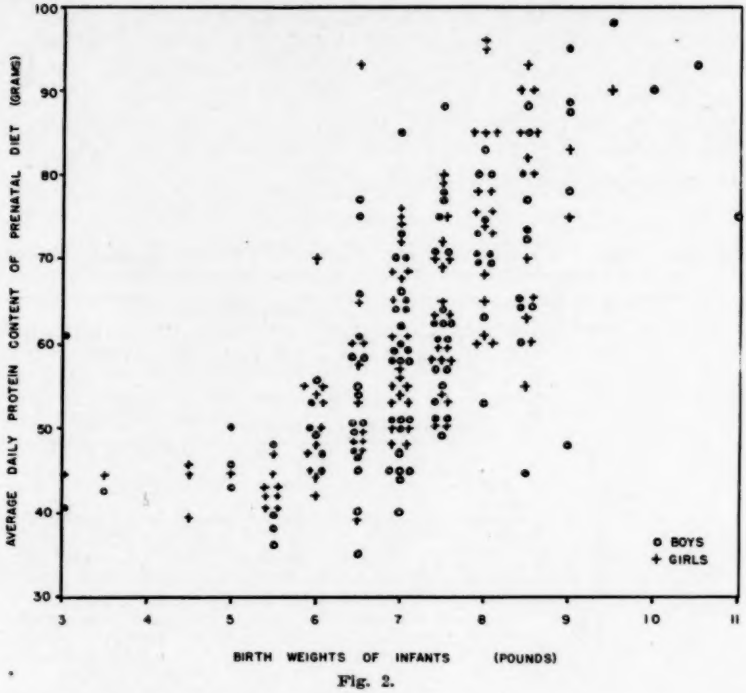

Fig. 2.

pregnancy, it is obvious that the longer and heavier infants were also in better physical condition in other ways as well. For the extremes of the group, the "superior" infants (those against whom there was no physical count of any kind at birth or within the first two weeks of life), the average birth weight was 8 pounds, 2 ounces (range 6 pounds, 10 ounces to 11 pounds, 7 ounces), and their average birth length was 50.8 cm. (range, 47.0 cm. to 53.3 cm.). In contrast, for the "poorest" infants (those who were stillborn died within a few hours or days of life, had a marked congenital malformation, were premature

TABLE VIII

RELATIONSHIP OF BIRTH WEIGHT* AND BIRTH LENGTH TO TOTAL PROTEIN IN MOTHER'S DIET DURING PREGNANCY (FOURTH THROUGH NINTH MONTH)

AVERAGE TOTAL PROTEIN (GM.)	UNDER 45	45 TO 54	55 TO 64	65 TO 74	75 TO 84	85 OR MORE
	Birth Weight in Pounds and Ounces					
Boys	6, 8	7, 0	7, 7	8, 0	8, 5	9, 2
Girls	5, 14	6, 14	7, 8	7, 12	8, 1	8, 8
	Birth Length in Centimeters					
Boys	47.6	49.3	50.2	51.4	52.0	53.3
Girls	46.8	48.7	49.9	50.3	51.4	52.4

*No infants under 5 pounds in weight were included in this distribution.

[under 5 pounds at birth], or were "functionally immature") the average birth weight was 5 pounds, 15 ounces (range, 3 pounds, 4 ounces to 8 pounds, 15 ounces), and the average birth length was 47.2 cm. (range, 40.6 cm. to 52.1 cm.).[1] For the entire group of 216 infants, excluding infants under 5 pounds at birth, the relationships of birth weights and birth lengths with the pediatric ratings assigned to the infants are shown in Table IX.

TABLE IX

RELATION OF BIRTH LENGTHS AND BIRTH WEIGHTS TO PEDIATRIC RATINGS ASSIGNED TO INFANTS AT BIRTH AND WITHIN THE FIRST TWO WEEKS OF LIFE

	NORM*	PEDIATRIC RATINGS†			
		"SUPERIOR"	"GOOD"	"FAIR"	"POOREST"
		Mean Weight in Pounds and Ounces			
Boys	7, 10	8, 6	8, 0	7, 4	6, 11
Girls	7, 8	7, 15	7, 12	7, 1	6, 15
		Mean Length in Centimeters			
Boys	50.6	51.5	51.1	49.9	49.1
Girls	50.1	50.8	50.2	49.2	49.4

*See Reference 9.

†The pediatric rating "superior" refers to all of the infants in the group of 216 against whom there was no physical count of any kind at birth or within the first two weeks of life. "Good" includes all infants in the group who were considered in good condition, except for one or two minor physical counts. "Poorest" includes all infants who were stillborn, died within a few hours or days of life, had a marked congenital defect, were premature, or "functionally immature," except that in this table we have excluded those who were premature (weight under 5 pounds). All infants not in one of these three classifications have been termed "fair" (within this group are some infants who were in the "fair to good" range and others in the "fair to poor" range in physical condition).

CONCLUSIONS

1. In a group of 216 women whose diets were studied during pregnancy, it was found that only 10 per cent consumed diets which met the amount of protein (85 Gm.) recommended by the Food and Nutrition board of the National Research Council for that period (fourth through ninth month). Sixty-eight per cent of the diets contained less than 70 Gm. of protein daily and 38 per cent less than 55 Gm. daily for this period.

2. A significant relationship was found to exist between the protein content of the mother's diet during pregnancy and the birth length of her infant. This increase in birth length can be demonstrated with each additional increment of protein in the prenatal diet irrespective of mother's height.

3. When the birth weights of the infants were considered in relation to the average number of grams of protein in the mothers' diets during pregnancy, it was found that an increase in birth weight* could also be demonstrated with each additional increment of protein in the prenatal diet.

*There was a tendency for the women whose diets during pregnancy were poor to have more difficult types of delivery, despite the fact that they had on the average smaller infants than the women whose diets were good or excellent. The average number of hours of labor experienced by the primiparas in the two groups was the same.[1]

4. Since the amount of protein in the prenatal diet seems to be a significant factor in determining birth length and weight, and since these are related to the physical ratings of the infants, the amount of protein in the mother's diet during pregnancy would appear to be a very important factor in determining the general physical condition of the infant at birth.

5. From this study it would appear that from the standpoint of birth length, birth weight, and general physical well-being of the infant at birth, the diet should be liberally supplied with protein during pregnancy. For practical purposes this study indicates that less than 75 Gm. of protein daily during the latter part of pregnancy result in an infant who will tend to be short, light in weight, and most likely to receive a low pediatric rating in other respects.

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OBSERVATIONS ON TETANUS IMMUNIZATION: THE DOSAGE OF ALUM-PRECIPITATED TOXOID AND THE USE OF FLUID TOXOID AFTER TRAUMA

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ACTIVE immunization against tetanus has established itself with surprising speed. Dunkirk, Pearl Harbor, and Libya were convincing field trials.[1-3] Only military engagements could have furnished the proof of the potency of tetanus toxoid in such a short time.

Since the first publication of Ramon and Zoeller,[4] many studies on the tetanus antitoxin production following different preparations, different dosages, and varying intervals have appeared. Reviews[5-10] of the subject are recent. The optimal procedures to be used for adults in military service and for infants and children, however, are unsettled. Age and occupation certainly have an important bearing on the technique used. The following studies on infants and children may not be applicable to immunization in the Armed Forces. However, as they bear on some of the still debated potentialities of tetanus toxoids, they may interest the "immunity officer" as well as the pediatrician.

TWO OR THREE INJECTIONS OF ALUM TOXOID

Using tetanus antitoxin production as a measure of potency, alum-precipitated tetanus toxoid has been found superior to fluid tetanus toxoid.[11-15] Higher titers of antitoxin are produced and are maintained longer after the former preparation. The question arises—should two or three injections of alum toxoid be given?

A comparison was made of the tetanus antitoxin titers attained in two groups of infants and little children. In the first group, sixty-eight children received two injections of 1 c.c. each of combined alum-precipitated diphtheria and tetanus toxoid† at a minimum interval of eight weeks, followed by a third injection of 0.5 c.c. of alum-precipitated tetanus toxoid at a minimum of sixteen weeks later. In the second group, ninety-three children received the first two injections but not the third. The children in both groups received pertussis vaccine‡ concurrently (as has been described elsewhere[15]). The age distribution in the two groups was similar, 80 per cent of the infants being

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†Kindly supplied by Eli Lilly and Co.
‡Kindly supplied by the Cutter Laboratories.

from 6 to 12 months of age at the time of the first injection, and the remainder being from 1 to 6 years of age.

Antitoxin titrations were performed on several occasions in each group for a year after completion of the immunization. The technique of Glenny and Stevens[16] was used. Each day's titration was controlled as previously described[15] with standard tetanus antitoxin.*

The levels of tetanus antitoxin found during the year subsequent to the courses of two or three injections of alum-precipitated tetanus toxoid are summarized in Tables I and II. All children in both groups, tested from two to four weeks after completion of their injections, produced at least 0.1 unit of tetanus antitoxin. At this time only one of thirty-nine children who had received three injections showed less than 1.0 unit of antitoxin (Table I). In the other group twenty of forty-six children exhibited titers under 1.0 unit (Table II). Thereafter the median antitoxin level dropped more rapidly in the "two-injection" group.

TABLE I

TETANUS ANTITOXIN TITERS IN CHILDREN RECEIVING THREE INJECTIONS OF ALUM-PRECIPITATED TETANUS TOXOID; 145 TESTS ON SIXTY-EIGHT CHILDREN

TETANUS ANTITOXIN TITERS	NUMBER OF SERA TESTED AFTER THIRD TOXOID					TOTAL TESTS
	2 TO 4 WEEKS	>3 <6 MONTHS	>6 <9 MONTHS	>9 <12 MONTHS	>12* <15 MONTHS	
Number of sera with 0.1 unit or more	39	25	29	14	33	140
Number of sera with <0.1 unit	0	1	1	1	2	5
Number of sera with 1.0 unit or more	38	13	9	1	4	65
Number of sera with <1.0 unit	1	13	21	14	30	79

*The difference in the total number of tests recorded in the >12 <15 column results from the inclusion of a test, the upper limit of which was unknown; that is, a serum containing 0.1 unit is included in the upper row of figures but not in the lower; as to whether the lower contained more or less than 1.0 unit was unknown.

TABLE II

TETANUS ANTITOXIN TITER IN CHILDREN RECEIVING TWO INJECTIONS OF ALUM PRECIPITATED TETANUS TOXOID; 145 TESTS ON NINETY-THREE CHILDREN

TETANUS ANTITOXIN TITERS	NUMBER OF SERA TESTED AFTER SECOND TOXOID					TOTAL TESTS
	2 TO 4 WEEKS	>3 <6 MONTHS	>6 <9 MONTHS	>9 <12 MONTHS	>12 <15 MONTHS	
Number of sera with 0.1 unit or more	45	25	11	14	28	123
Number of sera with <0.1 unit	0	3	4	3	12	22
Number of sera with 1.0 unit or more	26	3	1	0	2	32
Number of sera with <1.0 unit	20	25	13	16	32	106

The difference in the total number of tests above or below 0.1 unit as compared to the number of tests recorded above or below 1.0 unit results from the inclusion of tests, the upper or lower limit of which was not known.

*Kindly supplied by Dr. M. V. Veldee, Chief of the Division of Biological Control, National Institute of Health.

Between three and six months after completion of the injections, thirteen of twenty-six children in the "three-injection" group had levels of 1.0 unit or more, whereas only three of twenty-eight children tested in the "two-injection" group exhibited similar levels. Furthermore, the levels of three children in the latter group had dropped below 0.1 unit.

Between six and nine months after the injections the antitoxin levels in the "three-injection" group had decreased, but their median remained the higher. Four more children in the "two-injection" group showed levels below 0.1 unit.

TABLE III

THE NUMBER OF CHILDREN WITH TETANUS ANTITOXIN TITERS BELOW 0.1 UNIT PER CUBIC CENTIMETER WHEN TESTED NINE TO FIFTEEN MONTHS AFTER COMPLETION OF IMMUNIZATION

3 INJECTIONS GIVEN	2 INJECTIONS GIVEN
4 of 42 = 9.5%	15 of 54 = 27.7%

Difference in percentage = 18.2% ± 7.5%.

Between nine and fifteen months after completion of the injections the principal difference in the two groups was the proportion above and below the 0.1 unit level. This difference greatly favored the group which had three injections. Table III illustrates this. Fifteen of fifty-four children who had received two injections had antitoxin values of less than 0.1 unit as compared to four of forty-two children who had received the additional injection. The difference in percentage here is 18.2 per cent ± 7.5 per cent. Though not quite statistically significant, this difference in the prolonged maintainance of high titers is striking.

These findings are similar to those of Bigler and Werner.[8] Their significance depends on one's view as to the aim of tetanus immunization. Hall[6] has stated the view of the military. "Actual antitoxin level is not of prime importance. Basic immunity, or the ability of tissue to react with the production of antitoxin, is the essential condition." He has shown, and others including ourselves (vide infra) have confirmed his findings, that basic immunity is conferred by two injections of alum-precipitated toxoid. Basic immunity, then, is all that is desired providing (1) tetanus toxoid will be administered at the time of trauma and (2) all basically immunized individuals respond to this stimulating or "booster" injection rapidly; that is, within the incubation period of tetanus which may be as short as five days.[3]

If, however, the intent of the immunizing procedure is to protect completely the individual against tetanus for a given period of time, even though reinjection is unintentionally omitted after trauma, the quantity of circulating antitoxin becomes of great importance. Since the usual prophylactic dose of 1,500 units of tetanus antitoxin results in

the very transient presence of from 0.1 to 0.5 units of antitoxin per cubic centimeter,[8, 17, 18] it can be assumed that levels of homologous antitoxin over 0.1 unit are probably protective. Therefore, a course of injections which result in the maintenance of levels over 0.1 unit for a year would seem advisable. Annual reinjections would also be indicated.

This view seems to us the preferable aim for the pediatrician. Scratches and cuts are not noticed or may be neglected by parents. Toxin produced in a wound is not a trustworthy antigen.[19, 20] In this light the difference in distribution of titers following two as opposed to three original injections becomes important. A course of three injections, widely spaced, results in the maintenance of high levels for from twelve to fifteen months.

FLUID OR ALUM-PRECIPITATED TOXOID AFTER TRAUMA

The speed with which antitoxin is produced in a basically immunized individual is obviously of great importance. The factors upon which this speed is dependent would seem to be (1) the type of basic immunization, (2) the interval after the last injection, (3) the type of toxoid used as a stimulus, (4) the dose used, and (5) the individual's immunity mechanism (which is notoriously variable). Basic immunization has been discussed. The interval thereafter at which trauma may occur is an uncontrollable variable as is the individual's immunity mechanism. However, comparative studies on the type and dose of toxoid to be used for booster injections at the time of trauma can be readily made.

Gold[14] has suggested that fluid toxoid, being absorbed more rapidly, will produce more rapid rises in antitoxin than will alum-precipitated toxoid. The latter in a dose of 1.0 c.c. will raise tetanus antitoxin levels up to 0.1 unit in the majority of individuals on the fifth day.[17, 21, 22] Evans,[10] using a very potent fluid toxoid as a booster in individuals basically immunized with fluid toxoid, observed levels over 1.0 unit in the majority of individuals five days after reinjection. Unfortunately he had no observations at three and four days.

An opportunity to compare the speed of antitoxin production following alum-precipitated and fluid toxoid reinjection was available in the groups of children discussed above. The basic course of immunization consisted of the two or three injections of alum-precipitated toxoid. Reinjections were given from twelve to fifteen months after the last injection of the basic course. One cubic centimeter of fluid toxoid and 0.5 c.c. of alum-precipitated toxoid were the doses used. Blood for antitoxin titration was obtained at the time of reinjection. Subsequent specimens were obtained usually four, five, or seven days later. (Three children were tested twice during the subsequent week.)

The range of antitoxin levels at the time of reinjection was comparable in the two groups. In the twenty children reinjected with fluid

toxoid this range was from <0.05 units to 0.75 units with a median of 0.25 units. In the thirty-five children reinjected with alum-precipitated toxoid the range was from <0.05 to 1.0 unit with a median of 0.3 units. The results of the reinjections are shown in Table IV.

TABLE IV

THE SPEED OF INCREASE IN ANTITOXIN TITER FOLLOWING REINJECTION WITH EITHER ALUM-PRECIPITATED OR FLUID TOXOID

		DAYS AFTER REINJECTION							TOTAL NUMBER OF CHILDREN
		1	2	3	4	5	6	7	
Reinjected with fluid toxoid, 1.0 c.c.	Increase				7	8	1	3	20
	No increase				1				
Reinjected with alum-precipitated toxoid, 0.5 c.c.	Increase				3	10	1	10	35
	No increase		2	1	5	6			

All children had originally received either two or three injections of alum-precipitated toxoid, the last injection from twelve to fifteen months previously.

The first increase in titer obtained is the only one recorded. Further increases are omitted. When "no increase" is followed by "increase" both are recorded.

Fifteen of sixteen children reinjected with fluid toxoid and tested on the fourth or fifth day thereafter showed increases in titer. On the other hand, only thirteen of twenty-four children reinjected with alum-precipitated toxoid showed increases in titer at this time. The difference in percentages showing increase in titer by the fourth or fifth day is 40 per cent ± 11.7 per cent (statistically significant). Thus in two strictly comparable groups of children fluid toxoid is seen to result in a more rapid rise in tetanus antitoxin.

As the range of antitoxin levels at the time of reinjection was similar in the two groups (vide supra), the magnitude of increase in titer (expressed in terms of multiples of the initial titer) may be compared. The average increase among the fifteen children in the fluid toxoid group tested four or five days after reinjection was tenfold, whereas among the thirteen children in the alum-precipitated toxoid group it was five-fold. At seven days after reinjection the average increase in the fluid toxoid group was one hundredfold as compared to fortyfold in the alum-precipitated toxoid group.

In general, the magnitude of increase was greater when the initial titer was lower. For example, a child with 0.05 unit at the time of reinjection with fluid toxoid exhibited a rise to 10 units (two hundredfold) in seven days, whereas another individual with 0.5 unit at the time of fluid toxoid reinjection exhibited a rise to the same titer (twentyfold). There was no evidence, however, that the presence of a high level of tetanus antitoxin delayed the onset of the rise in titer after reinjection. When all children reinjected were considered, the appearance of increases in titer in those carrying 0.5 unit or more was as prompt as in those carrying less than 0.1 unit. Furthermore, no "negative phase" was observed.

CONCLUSIONS

Three injections of alum-precipitated tetanus toxoid at three monthly intervals initiate and maintain for one year high antitoxin titers, between 0.1 and 1.0 unit. This level is probably protective even if reinjection is impossible or is omitted because of parental negligence at the time of trauma. Two injections of alum-precipitated toxoid do not result so regularly in the maintenance of such high titers for a year. A basic course of three injections and annual reinjection with alum-precipitated toxoid are therefore recommended for children.

When laceration occurs in any individual previously injected with either alum-precipitated or fluid tetanus toxoid, a stimulating reinjection with fluid tetanus toxoid is to be preferred to one with alum-precipitated toxoid because the desired rise in antitoxin is more rapid.

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LIVER FUNCTION IN THE NEWBORN INFANT

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PHYSIOLOGIC icterus of the newborn infant, in so far as is known, in no way impairs the health or well-being of the infant and is seen so frequently as to be looked upon as a normal occurrence. Nevertheless, this phenomenon has been the subject of considerable investigation—not so much for its own importance as for the possibility that it might reflect certain other important physiologic changes of the neonatal period.

The most apparent explanation of this icterus is that it is purely hemolytic—a result of the reduction of the polycythemia of the fetus with the production of bilirubin more rapidly than the liver is able to excrete it. If this is the only factor, however, there should be some demonstrable relationship between the degree of blood destruction and the degree of hyperbilirubinemia. Not all investigators have found this to be true.[1-6] Investigations of changes in the erythrocyte fragility seen during the neonatal period have shown results which are at variance.[7-9] Sanford and associates[10] found no difference in the susceptibility of erythrocytes to hemolysis by bile salt solutions or in the protective ability of serum in icteric and nonicteric newborn infants. Even though there are changes in the cell volume[2] and the mean corpuscular hemoglobin concentration,[9] their significance in icterus neonatorum is obscure. It is generally believed that the total blood volume during this period is high, in relation to other body measurements, as compared with other periods of life. This is largely based on the studies of Lucas and Dearing,[11] whose method Brines and co-workers[12] consider to have given false high values. Accepting their values as valid, however, there was still no outstanding change that can be correlated with icterus neonatorum. The fact that hyperbilirubinemia exists even in the cord blood and that there is a direct relationship between the degree of hyperbilirubinemia in the cord blood and the intensity and duration of the hyperbilirubinemia in the infant[13] indicates that blood destruction is not the only factor involved.

Many investigators have directed their studies to the status of hepatic function during the neonatal period. The work of Hess,[14] Yllpo,[14] and Snelling[3] indicates that there is little excretion of bile prior to birth and in the first few days of life. Ross and associates[5] found the average total excretion of bilirubin and urobilin in the stools during the neonatal period to be lower in infants visibly icteric than in those not visibly so, a finding not in keeping with a purely hemolytic jaundice. The average

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total excretion of urobilin in the urine was also lower in infants visibly icteric.

There is other evidence to suggest that even though there should be an increased production of bilirubin, a normal liver would be able to maintain excretion without accumulation in the blood. McMaster and Rous[15] have shown that, in the dog, 5 per cent of the total liver substance can maintain excretion without the occurrence of tissue icterus. Rich[16] studied the blood bilirubin curve following the intravenous injection of bilirubin and believes that the normal adult liver is able to excrete many times the amount of bilirubin that is usually called upon it to excrete. He believes that uncomplicated excessive production of bilirubin is rarely a cause of jaundice and stresses the harmful effect of anoxemia on the liver. That a relative anoxemia exists in the fetus is generally admitted. That there is some element of liver dysfunction in "hemolytic" jaundice is also indicated by the work of Royer.[17] He has shown in experiments on animals that urobilin, when injected into the portal vein, passes through the normal liver into the hepatic vein in relatively small amounts; but when the liver is injured, urobilin readily passes through.

Rich[16] stresses the immaturity of the liver of the newborn infant. The possible relationship of icterus neonatorum to anatomic changes occurring in the liver during the neonatal period was studied by Snelling.[3] In evaluating impaired hepatic function, the possibility must be considered that the deficit could be cared for by a larger mass of functioning tissue in comparison to the remainder of the body. The figures given by Scammon[18] indicate that the liver of the newborn infant forms a higher percentage of the body weight than at any other period. The figures given by Coppoletta and Wohlbach,[19] however, do not bear this out.

The levulose tolerance test has been found to be low in newborn infants.[20] The bromsulfalein dye excretion test of Rosenthal and White[21] was performed on a series of infants by Herlitz.[22] In twelve healthy nonicteric infants, from 7 hours to 7 days of age, he found dye retention of from 10 to 30 per cent at thirty minutes. In eight "weak" icteric infants, from 5 to 10 days of age, he found dye retention of from 20 to 30 per cent at thirty minutes. He used a dosage of 2 mg. per kilogram of body weight administered as a 5 per cent solution into the superior sagittal sinus and obtained blood specimens from the same sinus but at a different point from the previous puncture.

Lin and Eastman[23] studied the behavior of intravenously injected bilirubin. They were unable to demonstrate any difference in the ability of the liver to excrete bilirubin in icteric and nonicteric newborn infants, nor in the infants as a group and adults.

In addition to the blood and the liver, there are three other factors that must be considered. The first of these is the part that the placenta may play. Gottlieb and Kearns[24] have been able to correlate degenera-

tive changes seen in the placenta with the degree of polycythemia and hyperbilirubinemia. They consider these placental changes a handicap to its respiratory ability. This leads to an increase in the compensatory polycythemia, which in turn offers a greater amount of erythrocytes for postnatal destruction. The role of the placenta has been considered by Schick.[25] In 1921 he advanced the idea that the hyperbilirubinemia is the result of the destruction of maternal hemoglobin during the latter months of pregnancy to make iron available for fetal hemoglobin, and that icterus neonatorum is a continuation of this physiologic process, influenced by the normal changes at birth. If this is the only factor, the hyperbilirubinemia should be much more marked in premature newborn infants. In twenty-eight premature infants, eighty-eight normal infants, and twenty-five overmature infants, Schick and co-workers[26] were unable to find any statistical relationship between the icterus index of the cord blood and the birth weight, length, or sitting height. Moreover, this hypothesis does not explain the marked increase in hyperbilirubinemia after birth.

The second factor is the relationship of the kidneys to bilirubin excretion. If the kidneys excrete bilirubin as a threshold substance, does this threshold differ in adults and newborn infants or from infant to infant? Following studies on ninety-eight newborn infants, Ross and associates[5] state that, when bilirubin in the blood serum reaches levels at which jaundice is present, bilirubin is nearly always present in the urine, and, conversely, when jaundice is not present, bilirubin is nearly always absent. Thus the renal threshold approximates the level at which visible icterus appears.

The third factor is the possibility of some alteration in capillary permeability or the ability of the tissues to absorb or bind bilirubin during this period. If, as in the adult, visible icterus appears only when the serum icterus index rises above fifteen or seventeen and the van den Bergh reaction shows five or more units and the degree of visible icterus is in direct proportion to the elevation of the icterus index and the hyperbilirubinemia,[5, 7, 8] this is probably not a factor. Bonar,[4] however, frequently could not detect visible icterus until the icterus index reached thirty and occasionally detected none when the icterus index was sixty. Neither did the icterus index always parallel the severity of the visible icterus. Waugh and co-workers[6] found that only in a general way was visible icterus present when the bilirubin reached 5 or more mg. per cent. Davidson et al[13] made a special study of this aspect of the subject and found that the level of hyperbilirubinemia at which visible icterus appears has wide variations but usually was approximately four or five milligrams per cent. They believe this to be at least twice as high as a similar figure for older children.

Our purpose in making this study has been to estimate the status of hepatic function during the neonatal period as indicated by one of the older liver function tests, the bromsulfalein test,[21] and two of the

newer liver function tests, the cephalin-cholesterol flocculation test[27, 28] and the serum diastase.[29] The results of our investigations of the serum diastase, however, will be presented in a separate paper.

MATERIAL

Full term newborn infants were selected at random from the newborn nursery of the St. Louis City Hospital. In birth weight and weight curve during the neonatal period they did not differ from the average. Most of them were breast fed; the remainder received an evaporated milk formula. More were born of multiparas than of primiparas. The mothers of most had received intramuscular vitamin K at varying intervals prior to delivery. All of the infants were white since only white patients are admitted to this hospital.

One of the mothers had eclampsia, one had pre-eclampsia, one had a mild hypertension that subsided with delivery, and one had been treated for syphilis. The other mothers showed no significant abnormalities. All of the infants are included in the report since the results obtained did not vary with the condition of the mother.

As a general practice, the obstetricians cut the cord immediately after delivery of the infant without waiting for pulsation to cease.

OBTAINING BLOOD SPECIMENS

Tests were performed three days a week. Ten cubic centimeters of blood were drawn from a femoral vein; occasionally the femoral artery was inadvertently used; occasionally the superior sagittal sinus was used. It might be asked if removal of such a large amount of blood so frequently might not so lower the amount of hemoglobin that icterus would be less apt to develop. However, since these icterus indices did not differ materially from those obtained on other infants who did not have as much blood removed, we do not consider this significant. Each infant was followed until the time of discharge from the hospital.

METHODS

The packed red blood cell volume was performed according to the method of Wintrobe.[30]

The icterus index was determined according to Davis' modification,[31] but on venous blood. Although not as accurate in measuring degrees of hyperbilirubinemia as actual bilirubin determinations, nor perhaps as accurate as other methods of determining the icterus index, it is a rapid simple method, and we felt that it was sufficiently accurate for our purposes.

The bromsulfalein test was performed as outlined by Rosenthal and White[21] except that the dye was administered in a 1 per cent instead of in a 5 per cent solution. This necessitated the use of a larger volume which permitted greater accuracy in measuring small amounts of dye.

Controls were performed on the dye solution to assure its stability. The dye solution was carefully measured in a tuberculin syringe and injected into a scalp vein. Controls were performed using other veins. One, and occasionally two, blood specimens were drawn at varying intervals of time after injection of the dye. The amount used was 2 mg. of dye per kilogram of body weight. There is some objection to the use of this test in the presence of icterus because the reading is a colorimetric one with which a marked icteric tint interferes. We do not believe, however, that slight degrees of icterus interfere with the reading but that fair approximations can be made when the degree of icterus is no higher than is usually seen in icterus neonatorum.

The cephalin-cholesterol flocculation test was performed as outlined by Hanger.[27, 28] The emulsion used was a partially oxidized type.* Emulsions were prepared freshly on the day used. Controls were performed. The tests were set up within a few hours of the time of obtaining the blood and read at twenty-four and forty-eight hours. Only the twenty-four-hour result is given in our report. The tests were read as either negative or positive. If positive, an effort was made to estimate the extent of flocculation by use of the terms 1, 2, 3, and 4 plus.

RESULTS

In general, our studies were troubled by the tendency of blood samples in this period of life to hemolyze readily.[4] This necessitated that occasional blood specimens be discarded. The selection of the icterus index figure of twenty as the dividing line in the series was purely an arbitrary one.

Packed Cell Volume.—The results of seventy-nine packed cell volume determinations on twenty-four newborn infants from 2 to 243 hours of age are graphed in Fig. 1. From inspection of this graph, two points are so outstanding as to be of significance even though the series is small. First, wide variations exist from infant to infant. Second, there is no correlation between the degree of blood destruction, as indicated by the packed cell volume, and the degree of icterus, as presented in this graph as to whether the icterus index rose to twenty or above or remained below twenty.

Icterus Index.—The results of the icterus index determinations have not been graphed since they were performed but three times a week. Higher values might actually have existed in some newborn infants in the intervening periods. The packed cell volume values, on the other hand, would not exhibit such an increase except for possible minor variations due to dehydration. The highest value obtained was one hundred, and all the infants except four exhibited an icterus index above normal.

The relationship between the icterus index and visible icterus that has been found by others has already been outlined in this paper. Since

*Supplied to us through the courtesy of Dr. David Klein of the Wilson Laboratories, Chicago, Ill.

our observations were not made every day, we can make no definite evaluation of this relationship. However, we did observe several infants with an icterus index of sixty and one with an icterus index of seventy-five without definite visible icterus. But, in general, if the icterus index was still high at the time of the next observation, visible icterus would have appeared. We can only conclude that the appearance of visible icterus is not only a function of the degree of hyperbilirubinemia, as indicated by the icterus index, but also of the length of time that this hyperbilirubinemia persists. The possibility that there may be some alteration in capillary permeability or the ability of the tissues to absorb or bind bilirubin during the neonatal period cannot be excluded.

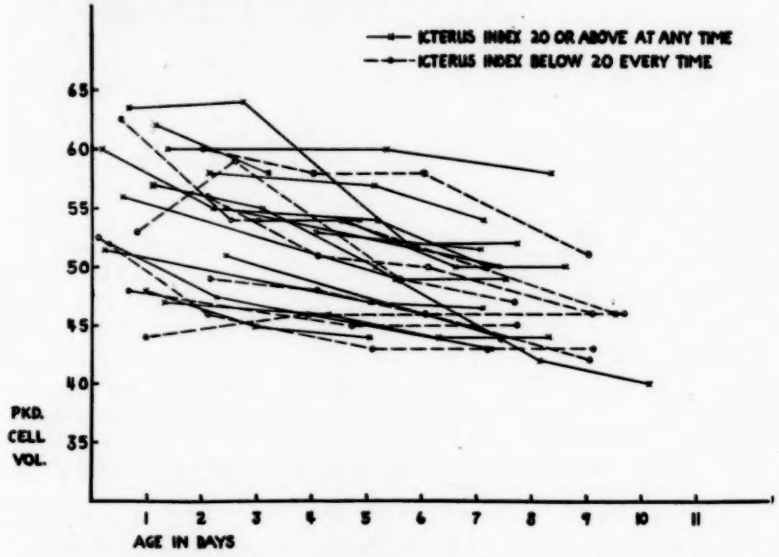

Fig. 1.—Seventy-nine packed cell volumes on twenty-four infants from 2 to 243 hours of age.

Bromsulfalein Dye Test.—The results of eighty-three bromsulfalein tests on thirty newborn infants from 5 to 252 hours of age are graphed in Fig. 2. As previously noted, usually only one, but occasionally two, blood specimens were taken on each infant. From inspection of Fig. 2 it is obvious that there is no significant difference in the results obtained on infants whose icterus index rose to twenty or above and those whose icterus index remained below twenty.

In 1938 MacDonald[32] reported the results of bromsulfalein tests on twenty-five normal adults, using a 2 mg. per kilogram of body weight dose and taking blood specimens at two-minute intervals. He found that only two showed over 20 per cent retention at ten minutes; none

over 15 per cent at twelve minutes; none over 10 per cent at fourteen minutes; and all but three, no retention at or before eighteen minutes. Similar results have been reported by Mateer and co-workers on forty normal adults[33] and again on twenty-five normal adults,[34] using the same dose but taking blood specimens at five-minute intervals. A comparison of our results with those obtained by these workers reveals a striking similarity.

We were unable to confirm the results obtained by Herlitz,[22] who reported retention of from 10 to 30 per cent at thirty minutes (as given earlier in this paper) in newborn infants.

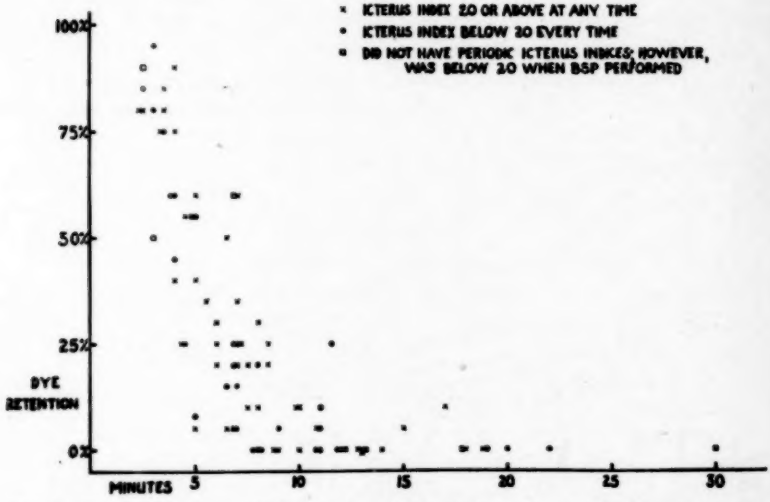

Fig. 2.—Eighty-three bromsulfalein tests on thirty infants from 5 to 252 hours of age.

Cephalin-Cholesterol Flocculation Test.—The cephalin-cholesterol flocculation test has been recommended as a test for active parenchymal hepatic disturbances.[27, 28] We hesitated to apply this test to newborn infants because one would expect any hepatic insufficiency during this period to be due to hypofunction which might be attributed to immaturity rather than to parenchymal damage. In Fig. 3 are graphed the results of ninety-six of these tests on twenty-seven newborn infants from 2 to 243 hours of age. It is evident that during the first few days of life this test usually shows varying degrees of positivity and that toward the end of the first week of life the test, in general, tends to become negative. Moreover, there is no obvious difference in the results obtained on infants whose icterus index rose to twenty or above and those whose icterus index remained below twenty.

These interesting results led us to investigate the results of this test on the mothers. In Fig. 4 are graphed the results of one hundred and

thirty-two of these tests on seventy-one mothers from six months gestation to ten days post partum. It is evident that, in general, the results obtained on the mothers as a group during the post-partum period approximate those obtained on the infants during the neonatal period. That the results obtained on the mothers and the infants are similar individually as well as as a group is shown in Fig. 5, in which there is

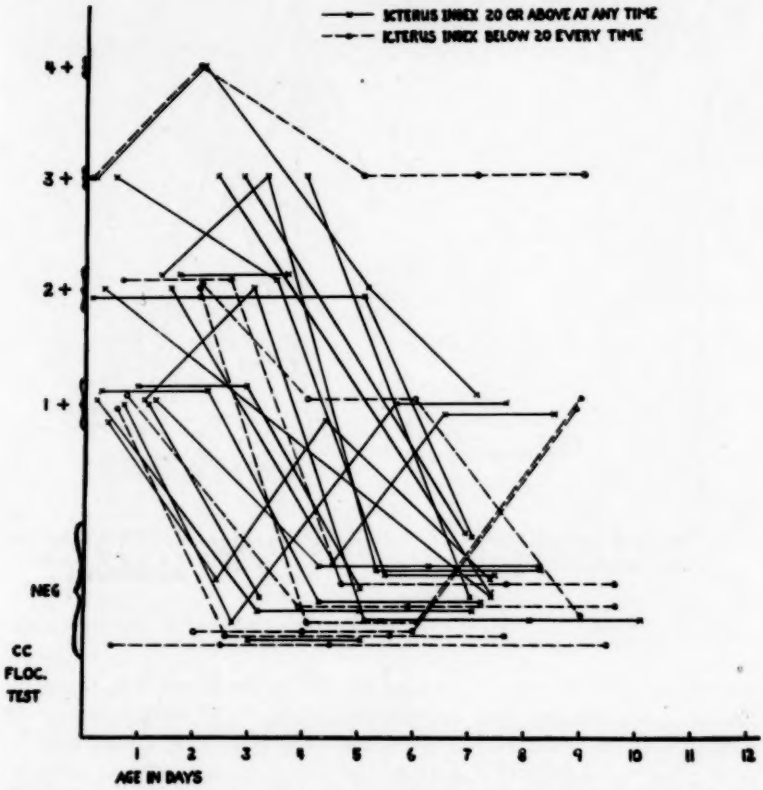

Fig. 3.—Ninety-six cephalin-cholesterol flocculation tests on twenty-seven infants from 2 to 243 hours of age.

graphed the results obtained on thirteen mothers and their infants. Except for Case 1, the results obtained in each mother and her infant approximate. This suggests that the cause of both is identical and must have been in operation prior to delivery. There is no obvious difference in the results obtained on mothers whose infants' icterus index rose to twenty or above and on those whose infants' icterus index remained below twenty.

From Fig. 4 it may be seen that during pregnancy from the time of six months gestation until the forty-eight-hour period preceding delivery

negative tests were obtained with one unexplained exception. This includes one mother who had been diagnosed as having syphilis; her test was negative. No subsequent observations were obtained on either her or her infant. Of sixteen tests obtained in the forty-eight-hour period

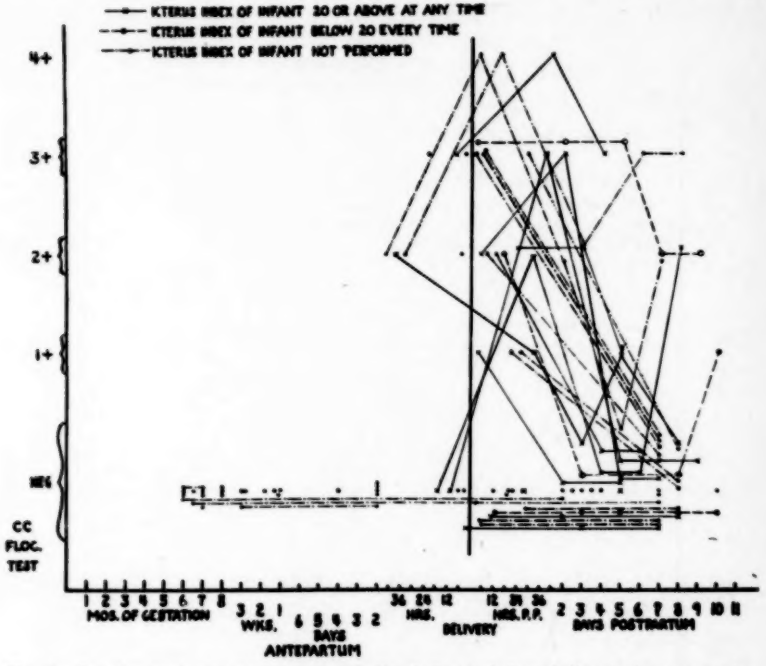

Fig. 4.—One hundred and thirty-two cephalin-cholesterol flocculation tests on seventy-one mothers from gestation of six months to the tenth post-partum day.

preceding delivery, seven were positive. Those of the postive group included one eclampsia and one pre-eclampsia. The tests obtained on post-partum mothers included the one with eclampsia whose test became negative during the post-partum period; a second pre-eclampsia, negative during the post-partum period; and a third pre-eclampsia, negative on the tenth post-partum day.

Why some of these mothers had positive flocculation tests and others negative tests we do not nderstand. An attempt was made to correlate the results with complications, age, number of previous pregnancies, type of anesthetic, length of labor, type of delivery, and whether or not the mother received vitamin K during labor. No correlation was found.

Results obtained with the cephalin-cholesterol flocculation test are markedly influenced by the type of testing emulsion used.[33, 34] It may be possible that our testing material was too sensitive and that false positives were obtained. Inspection of Figs. 3-5, however, shows

that results are fairly consistent. In reviewing our experience with this test in other conditions we find that it is usually positive in the presence of liver disease, that occasional false positive tests are encountered in normal individuals, and that frequently we find positive tests in patients suffering from some illness in which it is difficult to postulate liver damage. This last was noted by Hanger in his original communication,[27] at which time he raised the question of the specificity of the test.

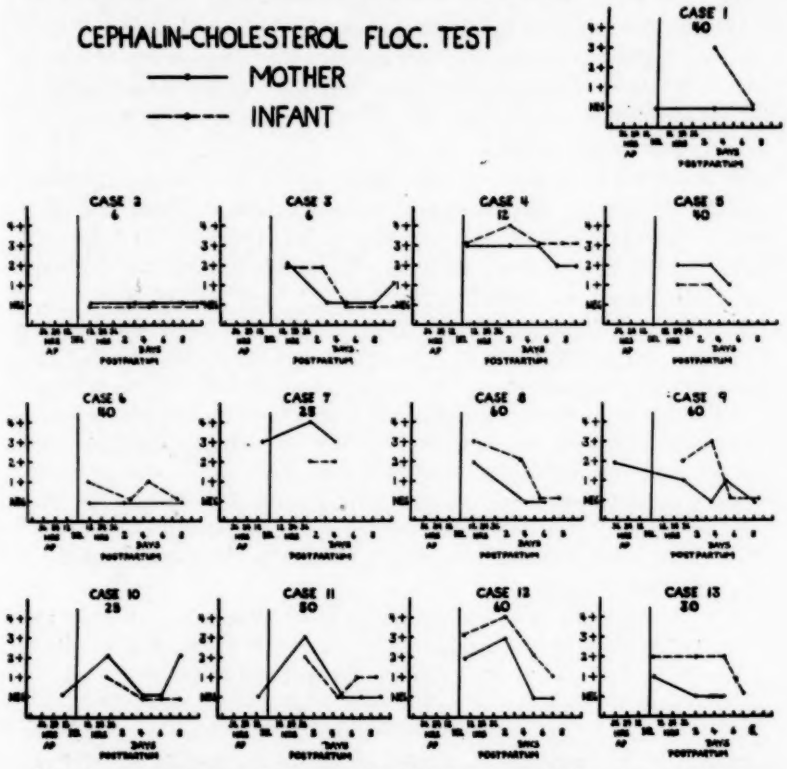

Fig. 5.—A comparison of the cephalin-cholesterol flocculation test on thirteen mothers and their infants. The number below the case number is the highest icterus index that was obtained on the infant.

In reviewing our cases of catarrhal jaundice, we find that in some patients the test may remain positive as long as three months after subsidence of clinical signs and symptoms. On the other hand, others have found a close correlation between the clinical course and the degree of flocculation.[28, 35] In our experience, if the twenty-four-hour reading is positive but flocculation is not complete, the forty-eight-hour reading almost invariably shows a somewhat heavier flocculent. Moreover, we are not sure that weakly positive tests are of significance. For that reason we have reported only the twenty-four-hour reading.

SUMMARY AND CONCLUSIONS

1. Although both blood destruction and icterus are present during the neonatal period, there is no demonstrable relationship between the degree of blood destruction, as indicated by changes in the packed cell volume, and the severity of the icterus, as indicated by the icterus index.

2. Visible icterus may not be present in the newborn infant even though the icterus index is considerably above fifteen, the visible threshold level commonly accepted for adults. If the icterus index remains elevated, however, visible icterus appears. The appearance of visible icterus is not only a function of the degree of hyperbilirubinemia, as indicated by the icterus index, but also of the length of time that this hyperbilirubinemia persists.

3. There is no difference in the ability of the liver to excrete bromsulfalein in newborn infants whose icterus index rises to twenty or above and those whose icterus index remains below twenty. Moreover, the ability of the liver of newborn infants to excrete bromsulfalein is similar to that reported for adults.

4. The cephalin-cholesterol flocculation test shows varying degrees of positivity during the first few days of life and, in general, tends to become negative toward the end of the first week of life. There is no obvious difference in the results obtained on newborn infants whose icterus index rose to twenty or above and those whose icterus index remained below twenty. Results similar to those obtained on the infants during the neonatal period were obtained on the mothers during the postpartum period. This suggests that the cause of both is identical and must have been in operation prior to delivery. We were unable to discover that cause.

We do not understand the significance of these findings. They may indicate impaired liver function. The fullest use of this test awaits an adequate explanation of the fundamental reaction involved.

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ROENTGEN THERAPY OF INTERSTITIAL PNEUMONIA

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LIKE "virus" pneumonia of the adult, interstitial pneumonia of children does not seem to respond to medical treatment. Satisfactory results were obtained with roentgen therapy in a series of patients.

The diagnosis was based upon the presence of fever, cough, and dyspnea, associated with infiltration along and around the bronchi and brochioles shown on roentgenograms, with absence of lobar and bronchopneumonic consolidations, and failure of the signs and symptoms to respond to sulfonamide medication. Of the thirty-six patients treated, twenty-six were males. The youngest was 2 days old; the oldest, 13 years. The majority were about 2 years of age. The rates of respiration were increased in all but five patients. Cyanosis was present in eleven patients. Temperatures varied between 99.4 and 104.6° F.; in most of the patients it was between 101 and 102° F. on admission. Leucocyte counts were elevated in most patients but depressed in some. The highest count was 40,100, the lowest 2,200, but from 12,000 to 16,000 was the most common figure. The differential counts were not significant. The pulse usually corresponded to the temperature. Some of the children were severely ill and had to be kept in oxygen tents; others did not seem to be greatly affected. On roentgenograms definite enlargement of one hilum or both was present in all cases, together with prominence of the pulmonary stroma in the perihilar areas, causing a hazy appearance of the involved region. In many patients the infiltration around the bronchi and bronchioles could be seen in the form of shadow lines accompanying the air-filled lumina, giving the appearance of thickened bronchial walls. Neither atelectases nor consolidations were noted in any of the patients in this series. This is not surprising, since the presence of air within the bronchi, as shown on roentgenograms, indicated that the air passages were not obstructed. The roentgenologic appearances most commonly observed in these patients are illustrated in Fig. 1.

The routine procedure developed in the Laconia Hospital since November, 1942, is as follows: As soon as the diagnosis is established, the patient is given one roentgen ray treatment with 140 kv., 20 ma., ½ mm. Cu plus 1 mm. Al filtration, the dose varying between 20 and 90 roentgens measured on the skin, through portals 15 cm. square

From the Department of Roentgenology, Laconia Hospital.

directed to the involved region with inclusion of the hila. The anode-skin distance is 35 cm. in infants and in children with flat chests and thin integuments but 50 cm. in stocky and adipose patients. Using the same skin dosage, this increase of the distance is sufficient for obtaining the desired increased penetration. The roentgen dosage is determined by the age of the patient and the duration of the disease. The more recent the illness, the smaller the roentgen dosage, in accordance with the rules applying to roentgen therapy of inflammatory lesions.[2] The older the child, the larger the dosage. For instance, 45 to 55 roentgens were given to children about 2 years old; 25 roentgens to babies under 4 months, and up to 60 roentgens to children over 5 years. The treatment was repeated with slightly larger doses (about 10 roentgens more) after twenty-four hours if fever, dyspnea, and cyanosis had not subsided by that time. One treatment was given to nineteen patients, two treatments to twelve patients, and three treatments to five patients.

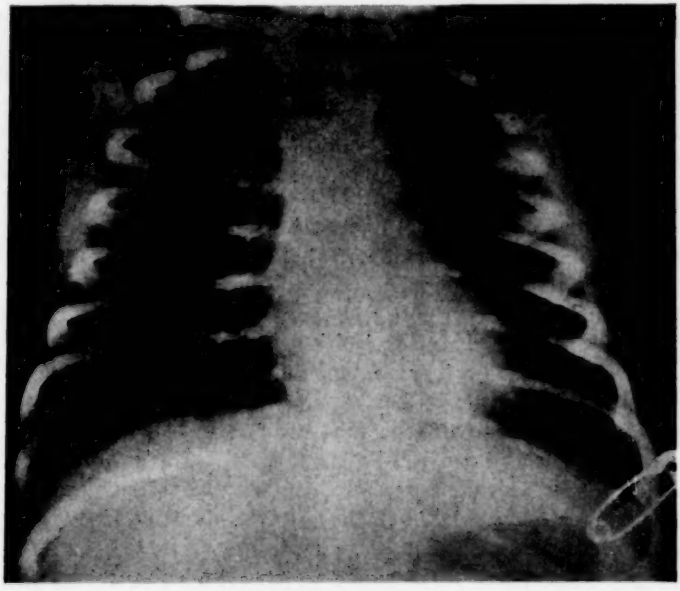

Fig. 1.—Teleroentgenogram of the chest of a girl 19 days of age with interstitial pneumonia. Temperature, 103.2° F.; pulse, 100; respiration, 60. Cough, dyspnea, cyanosis. Leucocyte count, 13,800. Duration, forty-eight hours. Haziness of perihilar areas, right more than left, caused by prominence of pulmonary stroma. In the original film the thickening of the bronchial walls and the air in the bronchi could be clearly seen. The reproduction cannot disclose these changes satisfactorily, but it shows the typical localization and extent of the lesion.

These roentgen doses represent about one-third to one-fifth of the doses generally recommended for the treatment of pneumonia, but it has been our experience during the past ten years that the larger con-

ventional doses used in the radiation therapy of inflammatory disease are usually not necessary and sometimes dangerous. In three children treated with 100 and 150 roentgens during the acute stages of interstitial pneumonia, cyanosis, chills, and convulsions developed eight and ten hours after irradiation. Doses of about 50 roentgens have been advocated by Chamberlain[1] for the treatment of certain infections and have been found effective in the treatment of "virus" pneumonia of adults.[3] But, like any other mode of therapy, roentgen irradiation should be adapted to the condition present in the individual case and should not be rigidly standardized. For example, pleural effusion covering the involved area absorbs an appreciable amount of radiation and prevents it from reaching the lung; wherefore, the roentgen doses measured on the skin should be increased in these cases. Conversely, a patient with thin skin and muscles requires a roentgen dose smaller than the average. The presence of severe constitutional reactions, such as high fever, vascular collapse, pronounced cyanosis, makes it necessary to use small doses. Increasing the roentgen doses in proportion to the acuteness and severity of the disease is bad practice.

Clearly it is difficult to ascertain the effects of any type of treatment in acute infections. Control series must be evaluated with reserve since it is rarely possible to find cases which are really comparable. The factors which determine the course and severity of interstitial pneumonia are variable and cannot be controlled. Although a control series has been analyzed, the confirmation of the effect of radiation which it seems to show does not mean much. Following a suggestion made by Dr. W. Edward Chamberlain, the cases of this series have been plotted according to the duration of fever, cough, and dyspnea before and after roentgen irradiation (Fig. 2). The graph shows that the clinical manifestations subsided consistently within short periods after treatment, irrespective of the previous duration of the disease. This may be considered strong presumptive evidence to show that it is actually the treatment itself which effected clinical cure, although it cannot be proved beyond doubt that these patients would not have recovered as rapidly without roentgen therapy. About one-third of the patients were not admitted to the hospital but returned home after irradiation. This suggests that the results of the treatment were not due to some associated therapeutic factors such as are involved in hospitalization. Moreover, none of the patients had previously responded to any other mode of treatment.

One of the patients, a prematurely born twin, died. In two others, the results of roentgen therapy were not fully convincing. In all the other cases the signs and symptoms subsided within twelve to seventy-two hours after irradiation. The lowest total roentgen dosage given was 22 roentgens; the highest, 180 roentgens. Except for the reactions

in children who had received doses exceeding 100 roentgens in a single treatment, as mentioned above, no ill effects were observed.

With but few exceptions, the temperature, pulse rate, and respiration returned to normal within eight to twenty hours after treatment. This improvement was gradual, and there was no crisis or other dramatic effect. For two or three days following irradiation cough became productive, and fairly large amounts of grayish mucus, sometimes tinged with blood, were expectorated. Cyanosis, when present, subsided together with the dyspnea. The children seemed to be in good health except for the presence of some cough. Those who had been vomiting during the febrile stage ate well after treatment. None of the patients developed the persistent and annoying cough which is

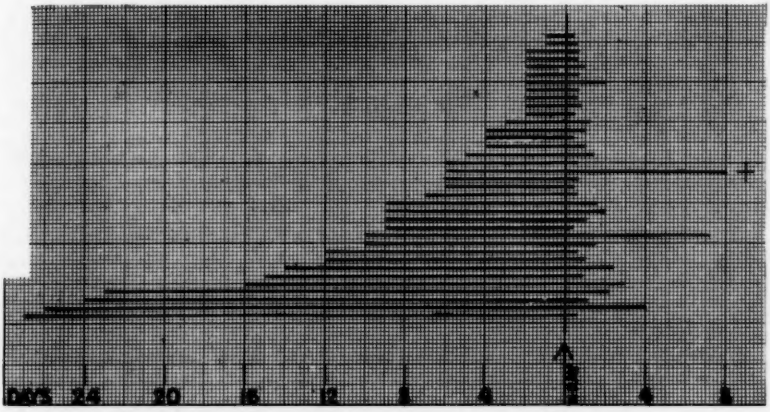

Fig. 2.—Duration of interstitial pneumonia before and after roentgen therapy. Each horizontal line represents one case. The vertical line indicates the time at which the first roentgen ray treatment was given. The right ends of the horizontal lines mark the times at which the patients were free of fever, dyspnea, and cyanosis and were considered cured. One patient died (cross) (see text).

common during convalescence in children not submitted to roentgen therapy. Except for four patients with otitis and frontal sinusitis, the patients were discharged from the hospital, or resumed their normal activities when kept at home, four to five days after the first roentgen ray treatment. But, as in most other types of pulmonary disease, the clinical cure did not coincide with a disappearance of the abnormal shadows presented on the roentgenograms. The prominence of the pulmonary stroma did not vanish until about one week after clinical cure, and the hila remained enlarged for periods extending to several months.

The biologic mechanisms responsible for the therapeutic effect of small roentgen ray doses are not yet fully understood. Many theories have been offered. None covers all of the facts observed.

SUMMARY

Following roentgen irradiation with small doses, rapid and consistent improvement of the clinical condition took place in thirty-three of thirty-six patients with interstitial pneumonia. Treatment with doses exceeding 100 roentgens during acute stages resulted in severe constitutional reactions. The clinical manifestations, roentgenographic findings, and method of treatment are described in brief.

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BREATH-HOLDING SPELLS

Their Relationship to Syncope, Convulsions, and Other Phenomena

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INTRODUCTION

IT IS common knowledge that small children frequently hold their breath in the course of violent crying. Parents usually accept such episodes as evidence of the child's "temper" and feel little or no concern over them. Only the more violent spells which are associated with cyanosis, unconsciousness, or convulsions are brought to the attention of physicians. Recently two groups of children with breath-holding spells have come to our attention. The first group was seen in the course of routine observations of children attending a well-baby clinic. Children in the second group were brought to a children's hospital specifically because of breath holding. The former offered the opportunity to make observations on breath holding in a sample of the general population; the latter group made possible a study of the more dramatic aspects of the spells and of the outcome. The information obtained has brought out certain facts of interest to pediatricians, child psychiatrists, and physiologists.

The medical literature contains relatively few references to breath-holding spells, although they were undoubtedly well known before the excellent description by Meigs, of Philadelphia, in 1848.[1] The reports by Neumann,[2] Bratz,[3] Ibrahim,[4] Abt,[5] and Stier[6] discussed the subject thoroughly from the clinical viewpoint. Peiper[7] has made observations on the physiology of respiration during the spells of a single subject; Kanner[8] has discussed the personality and behavior characteristics seen in association with breath holding. Although the condition is mentioned in numerous other reports and textbooks, little is added to the knowledge of the mechanism and outcome.

INCIDENCE AND FREQUENCY

People who have contact with many small children are aware of the fact that breath-holding spells are common occurrences among otherwise well children. However, statistical data regarding the frequency have heretofore not been available. During the past three years facts regard-

From the Department of Pediatrics of The Johns Hopkins University Medical School, the Epilepsy Clinic of The Johns Hopkins Hospital, and the Mental Hygiene Study of the Eastern Health District in Baltimore at The Johns Hopkins University School of Hygiene and Public Health. The clinical work at the well-baby clinic was carried out by Dr. Paul V. Lemkau, Dr. Ruth W. Lidz, and Miss Marcia Cooper of the Mental Hygiene Study. Miss Mabel Stone of the Epilepsy Clinic assisted in the follow-up study of the hospital group. This study was supported in part by the International Health Division of the Rockefeller Foundation.

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ing the incidence of breath-holding spells have been obtained by the Mental Hygiene Study in the Eastern Health District of the City of Baltimore. A group of children, ranging in age from a few weeks to about 6 years, was drawn from the regular clientele of a *well-baby clinic* without regard to the presence or absence of apparent mental hygiene problems. In every instance a detailed history was taken by a psychiatrist and, among other things, the occurrence of breath-holding spells was asked for as a routine procedure. In all, 188 children have thus been examined. The group is about equally divided between the sexes and also between whites and Negroes. It is slightly overweighted with first-born children of young mothers, but appears otherwise to be a fairly representative sample of the population in that section of Baltimore from which it is drawn. The economic, occupational, and educational status of both white and colored families is below the average for the city.

TABLE I

CHILDREN WITH BREATH-HOLDING SPELLS* SEEN AT THE WELL-BABY CLINIC—COLOR AND AGE AT INTERVIEW

AGE IN MONTHS	TOTAL CHILDREN	WITH BREATH HOLDING	PER CENT
	White		
0-11	23	10	43.5
12-23	25	9	36.0
24-35	14	5	35.7
36 and over	20	6	30.0
Total	82	30	
	Negro		
0-11	9	3	33.3
12-23	30	9	30.0
24-35	29	4	13.8
36 and over	38	5	13.2
Total	106	21	

*Includes children with breath-holding spells at time of interview and those with history of breath holding.

This material permits the computation of the *incidence* of breath-holding spells in a sample of an average child population. The occurrence of such spells was reported by the informant, usually the mother, in fifty-one instances. In some children the habit was still active at the time of the interview with the psychiatrist; in others the attacks had already ceased to occur. In a few cases there had been only one or two breath-holding spells; in the other children the phenomenon had been observed over a longer period. Table I presents the numbers of all children seen by color and age. It also shows the number and the percentage of breath holders in each group. As all individuals with a history of breath holding are included, one would expect an increase in these percentages as long as new cases are added and a constant proportion after the period of susceptibility has been passed. Actually such a trend is not found. The proportion of present and past breath holders is approximately the same for white children of all age groups

covered in the present study and for Negro children up to the age of 2 years. The proportion among Negro children above that age is significantly lower. These figures indicate two things: first, that most cases of breath holding begin very early in life, and, second, that there is a tendency especially among the Negro mothers to forget the problems of infancy as their children grow older. The conclusion cannot be avoided that the reporting of breath-holding spells among Negroes in our material is grossly deficient. The computation of incidence must therefore be limited to white children.

The incidence of breath-holding spells in a generation of children may be estimated from our data by the abridged method of Weinberg.[9] On the assumption that new cases occur at a fairly constant rate during the age period of susceptibility, one-half of the individuals examined during that period are potential future victims. Therefore only one-half the number of such persons actually seen is included in the population of reference, whereas persons examined after the age period of susceptibility are counted full. The age of onset was remembered by the informant in thirty-six of the fifty-one cases of breath holding. In thirty-two children, or 89 per cent, the spells began during the first eighteen months of life. Even if we allow for the fact that some of the children seen by the Mental Hygiene Study were very young and may have developed the breath-holding habit after the history was taken, we feel safe in stating that in this group of children breath holding usually begins before the middle of the second year. For purposes of computation, therefore, the first eighteen months of life have been assumed to be the period of susceptibility. Of the eighty-two white children examined, thirty-four were younger and forty-eight older than 18 months when the history was taken. Using Weinberg's formula, the population of reference is 17 + 48, or 65, rather than 82, and the incidence of breath-holding spells 30 in 65, or 46.2 ± 4.2 per cent. Even the small sample of white children available for analysis permits the generalization that breath-holding spells are a quite common phenomenon and thus confirms our everyday impressions. Although from the material at hand a much lower incidence can be computed for Negroes than for whites this difference should be regarded as spurious and be neglected in view of what has been said previously about the incompleteness of the data on Negro children. There is, of course, no proof that breath-holding spells occur as often among Negroes as among white children, but neither have we evidence to the contrary.

Children brought to a *hospital* specifically because of breath-holding spells represent an entirely different problem from those in whom the breath holding was discovered in the course of routine history taking. Whereas in the one group the symptoms had given the family no great cause for alarm, in the other considerable anxiety had arisen over the possibility of a permanent handicap or even of death in an attack. The cause of this alarm was not the breath holding itself but the frequent

repetition of the attacks, or the presence of marked cyanosis, unconsciousness, or convulsions. The incidence of these more dramatic manifestations is, of course, much lower than that of simple breath holding. Among 95,000 children seen in the Harriet Lane Home of the Johns Hopkins Hospital over a period of twenty-two years, there were eighty-three who presented such complaints, a proportion of somewhat less than 0.1 per cent. This is comparable to a proportion of 0.16 per cent for pyloric stenosis among the same group of children. No satisfactory data are available to indicate the proportion of simple breath-holding spells which progress to the more troublesome stages. However, it is interesting to note that only one of the fifty-one children with breath holding seen in the well-baby clinic later developed a spell with associated loss of consciousness and convulsions.

The distribution of the hospital group by race is strikingly different from that of the group seen in the well-baby clinic. Of the eighty-three children, only four were Negroes against about 50 per cent Negroes in the general dispensary clientele. This finding suggests that while Negro children are not demonstrably less susceptible to simple breath holding, they are much less likely than whites to progress to the more dramatic and serious forms. In addition, the more placid and sometimes negligent parents are less inclined to bring their children to the hospital than white parents would be under similar circumstances.

The age of onset was ascertained for all but five children in the hospital group, and in sixty-six individuals, or 85 per cent of the known cases, it was less than 18 months. One child began to have spells as early as one week after birth and two, not until the age of 4 years. The general picture is the same as in the group from the well-baby clinic.

The frequency with which breath-holding spells tend to occur and recur in particular individuals shows an enormous variability. This information was not collected at the well-baby clinic but is available for sixty children in the hospital group. In nine instances, 15 per cent, it was reported that the spells came as often as several times a day but, in an approximately equal number, as rarely as once a month or at even greater intervals (Table II). The most common frequency seems to be about once a week.

TABLE II

FREQUENCY OF BREATH-HOLDING SPELLS IN CHILDREN IN THE HOSPITAL GROUP

FREQUENCY OF SPELLS	CASES
Several times a day	9
About once a day	7
Several times a week	7
About once a week	17
Several times a month	9
About once a month	4
Less than once a month	7
Not stated	23
Total	83

DESCRIPTION

Typical breath-holding spells are easily recognized and follow a consistent pattern. The child becomes angry, afraid, or is injured. Two or three loud cries follow, after which he holds his breath in expiration and goes into a state of generalized tonic spasm which gives the impression of being induced voluntarily. An ominous silence accompanies the period of apnea. If this lasts only from five to ten seconds some cyanosis may be evident, but a feeble cry followed by more vigorous crying soon indicates that respiration has been resumed. For approximately one-half minute the child may appear confused and exhausted, but thereafter acts as well as ever. Such mild and short breath-holding spells are common occurrences in otherwise well children. Unless the apnea lasts longer and is accompanied by unconsciousness, the mother rarely feels sufficient concern to bring the matter to the attention of a physician.

Parents quickly learn that if the silence accompanying the apnea is not recognized as an urgent warning, trouble may follow. An additional five to ten seconds of apnea may result in severe cyanosis* and unconsciousness, causing the child to fall stiffly to the floor. Severe bumps to the head and even a broken nose may result. Prolongation beyond thirty to forty-five seconds may be associated with generalized rigidity, with mild convulsive jerkings, either local or generalized, or with typical epileptiform seizures. Depending on the duration of the apnea and cyanosis, the recovery period of weakness and exhaustion is correspondingly prolonged.

A history of preceding circumstances which arouse violent emotional reactions is an indispensable part of a true breath-holding spell. With the initial episode, the precipitating factors may be overlooked, but with recurrences they are usually evident. Temper or anger reactions are by far the most common precipitating factors. Among the children attending the well-baby clinic, these were offered as the "cause" in 90 per cent of the cases; in the group brought to the hospital the corresponding figure was 77 per cent. In the remaining cases pain, without evident anger, and fear were offered as the inciting circumstances. Table III summarizes these findings. In general, the children whose breath holding was induced by pain or fear had less frequent spells than those of the anger group.

The intensity or severity of the breath-holding spells varies greatly from child to child and even from time to time in the individual. Table IV shows the proportions of children in the normal and in the hospital group whose spells progressed to the various stages. As would be expected, among the children brought to the hospital because of the condition, the incidence of cyanosis, unconsciousness, and convulsions was much higher than in those whose spells were discovered in the course of a routine examination. While the children seen in the hospital are

*In Negro children the cyanosis is evident chiefly from the color of the lips.

TABLE III

DISTRIBUTION OF CHILDREN WITH BREATH-HOLDING SPELLS BY PRECIPITATING CAUSE

	WELL-BABY CLINIC GROUP	HOSPITAL GROUP
Cases		
Anger	38	64
Pain	2	10
Fear	2	9
Not recorded	9	–
Total	51	83
Per cent		
Anger	90	77
Pain	5	12
Fear	5	11
Total	100	100

TABLE IV

PRESENTATION OF CHILDREN WITH BREATH-HOLDING SPELLS BY STAGE REACHED

	WELL-BABY CLINIC GROUP	HOSPITAL GROUP
Cases		
Breath holding	51	83
Cyanosis	9	77
Unconsciousness	1	50
Convulsions	1	41
Per cent		
Breath holding	100	100
Cyanosis	18	93
Unconsciousness	2	60
Convulsions	2	49

not directly comparable to the normal group, the data, nevertheless, emphasize the fact that breath-holding spells are not necessarily as innocuous as previous work would indicate (Cases 4 to 10).

DIFFERENTIAL DIAGNOSIS

Typical breath-holding spells are easily recognized. The following triad of symptoms is seen in no other condition: (a) precipitating circumstances which arouse an acute emotional response, (b) violent crying ending suddenly in expiratory apnea, and (c) depending on the individual child and the duration of the apnea, the occurrence of cyanosis, unconsciousness, or convulsions. Rarely, however, does the physician have the opportunity to witness such an episode from the beginning, and consequently must base his judgment on the description offered by the parents. Under these circumstances it is not surprising that errors of diagnosis are occasionally made. Nine such mistakes were found in the hospital material from which our present group of eighty-three cases was drawn. Of these nine cases, two infants proved to have congenital laryngeal stridor, two pertussis, and five epilepsy. Three additional cases (Cases 1 to 3) were also excluded from the group because of the impossibility of distinguishing between breath-holding spells and epilepsy. Tumors of the larynx, the laryngospasm of tetany, and enlargement of the thymus also produce symptoms which may be confused

with breath holding. If the physician can witness an attack, the differentiation between breath holding and the symptoms arising from the larynx per se is easily made. In the latter, noisy and stridulous breathing or retraction of the intercostal spaces during forced inspiration make clear the obstructive nature of the symptoms. Direct laryngoscopic examination and x-ray studies of the thymus and trachea may be helpful in certain cases. The respiratory difficulty and cyanosis associated with the spasmodic cough of pertussis should cause no confusion if adequate attention is paid to the paroxysmal nature of the cough itself.

The distinction between true epileptic seizures and the unconsciousness and convulsions of prolonged breath-holding spells may, however, offer difficulties. It should be recalled that epileptic seizures, especially in small infants, are often ushered in by several loud cries, followed by spasm of the respiratory muscles as part of the generalized tonic spasm. The apnea and cyanosis which result may be confused with breath holding. As the attacks are repeated, however, a difference becomes evident. Epileptic seizures start without apparent cause; breath-holding spells are always provoked by an episode which arouses anger, pain, or fear. In epilepsy, the crying, respiratory spasm, unconsciousness, and convulsions begin almost simultaneously, whereas in breath-holding spells an orderly sequence is usually recognized. Localizing features in the attacks are suggestive of an epileptic background. In breath-holding spells, as in various forms of syncope, returning consciousness with only mild sequelae follows almost immediately the improvement in the circulation. In contrast to this, the epileptic patient regains consciousness more slowly, confusion persists longer, and afterward he goes into a profound sleep from which he often awakes with a headache. The electroencephalogram, while not always conclusive, may contribute information of value. In cases of doubt, accurate observations of the details of a seizure and a knowledge of the course extending over a period of time may be the only ways of distinguishing between breath-holding spells and epileptic attacks.

PATHOLOGIC PHYSIOLOGY

From a study of the literature and of our own experiences, it has been possible to gain some degree of understanding of the mechanism involved in the initiation and course of a breath-holding spell. For convenience of description this will be considered under the headings of (1) initiating mechanism, (2) cyanosis, (3) unconsciousness, and (4) convulsions. Individual spells are too short in duration to be analyzed in this way, but a detailed study of the child and his background may make the facts clear.

The breath-holding spell may be described as a characteristic response to a variety of stimuli which induce violent crying. Normal vigorous crying consists of a series of quick deep inspirations followed

by slow vocalized expirations. A short pause occurs at the end of expiration which in vigorous crying may be prolonged to from one to three seconds. In newborn infants expiration may be so complete and the pause so long that the face becomes suffused and slightly bluish in color. Although the regularity of the normal crying will usually separate it from true breath-holding, the distinction between normal and abnormal is not a sharp one but shades off, depending on the length of the pause at the end of expiration.

By definition, breath-holding spells are induced by crying. While the provocation of the crying will be discussed below in the section on behavior aspects, the *mechanism* through which crying initiates the breath-holding reaction is of interest here. The appearance of the symptoms in the organs of respiration would suggest that this particular physiologic system has, in some way, become sensitized and reacts more violently than other systems, or than the same system in other individuals. To a certain extent this sensitivity probably indicates hereditary physiologic imbalance, but it is interesting to note that in the present hospital group of eighty-three children, seven began to have breath-holding spells immediately after pertussis, and two others, after bronchitis (Cases 10, 11, 15, and 20). Pertussis, more than any other childhood disease, is known to sensitize the respiratory apparatus to certain patterns of response, as evidenced by the recurrence of a pertussis-like cough with succeeding respiratory infections and the frequency of pertussis as an antecedent to asthma in childhood. In addition to this sensitivity of the respiratory system, the repetition of the reaction soon establishes it as a semireflex, or pattern. Ibrahim and Stier discuss breath holding as a conditioned reflex and others have considered it as a "respiratory neurosis" initiated by the stimuli of frustration, anger, pain, fear, etc.

After the initiating mechanism has been set in motion, a definite cycle of events appears to follow. Peiper has made careful tracings of the respiratory movements during breath-holding spells in an eight-month-old child and has shown clearly that the breath is held in the phase of complete expiration. In one instance during the breath-holding phase he was able to observe automatic movements of the diaphragm *without* corresponding effects on pulmonary ventilation or on the degree of cyanosis. This observation has since been confirmed by others.[10] As Peiper suggests, this would indicate a spasm of the glottis as a part of the picture of generalized rigidity and spasm. The abruptness with which a breath-holding spell ends might also be interpreted as the relaxation of such a spasm. These observations are of particular interest because they add an important point to an understanding of the mechanism of the total reaction.

It is well known that the *cyanosis* observed during breath holding comes on more quickly and assumes a more intense degree than would be expected from the duration of the apnea. Weiss and Baker[11] have

made similar comments regarding the development of cyanosis in patients with carotid sinus sensitivity. Swimmers, for example, remain under water much longer than the duration of an ordinary breath-holding spell without developing cyanosis. The difference probably depends on the fact that the crying infant holds his breath in the phase of complete expiration, associated with spasm of the respiratory muscles and increased intrathoracic pressure. The alveoli and bronchial tubes thus contain only alveolar air and this in reduced quantity which could not, of course, supply adequate oxygen to the blood for longer than a few seconds. The accompanying changes in circulation are not clearly understood. Peiper points out that the final relaxation and renewal of respiration corresponds in character to that seen in experimental animals following sudden withdrawal of oxygen supply. The respiratory spasm and rapidly developing cyanosis would, therefore, seem to depend in part, at least, on spasm of the glottis and respiratory muscles at the expiratory phase of a prolonged cry.

If the cyanosis persists longer than a few seconds, *consciousness* is lost in breath-holding spells. As in other forms of syncope, this probably depends on acute cerebral anoxemia as well as circulatory and reflex changes. The role played by the lungs and glottis in the development of this anoxemia has been discussed above. Direct observations are, of course, difficult to make on small children having unpredictable and brief attacks, but we have been able to observe evidences of abnormal vagotonia in three patients. During the breath holding, a marked slowing or stoppage of the heart beat occurred, and pressure on the eyeballs caused a similar change in heart action. Since the glottis and laryngeal muscles are innervated by the vagus, primarily through the recurrent laryngeal nerve, it is perhaps not surprising that other effects of intense vagal stimulation should be present in certain patients. No data are available regarding blood pressure and circulatory changes during breath holding.

It is interesting to note the points of similarity between breath-holding spells and other forms of syncope, notably carotid sinus sensitivity, paroxysmal heart block, and ordinary faints. The unconsciousness in all is associated with changes in circulation and may be accompanied by convulsions. The cyanosis or pallor develops with great rapidity. An upright posture encourages the development of unconsciousness. Evidences of vagotonia may be present in all these conditions. Unfortunately, small infants with erratic breath-holding spells are less suitable subjects for a study of the physiologic mechanism involved than are adults with other forms of syncope. Weiss and Baker have suggested the following classification for patients with carotid sinus sensitivity: (a) marked asystole, or sudden slowing of the pulse, with or without marked fall in arterial pressure; (b) marked fall in blood pressure without essential cardiac slowing; (c) marked paling of the face but without essential slowing of the heart rate and without

fall in the arterial blood pressure. It seems possible to us that future observations may permit breath-holding spells to be grouped along these lines, but at present the data are insufficient for this purpose. For the time being we can only surmise that the unconsciousness developing in breath-holding spells is similar to that seen in other forms of syncope.

In certain patients the breath-holding spells may reach a climax in a *convulsion*. Usually this is a generalized tonic-clonic seizure similar in every way to that seen in epilepsy. Rarely opisthotonus or focal symptoms may be present. Like the unconsciousness mentioned above, these convulsive manifestations probably have some relationship, either direct or indirect, to cerebral anoxemia, for it is well known that sudden occlusion of the carotid arteries[12] or rapid withdrawal of the oxygen from the inspired air may be followed by convulsions in experimental animals.[13] Syncope from whatever cause in human beings may also be associated with convulsions. While the present studies offer no new data regarding the mechanism of the production of the acute convulsive manifestations, there can be no doubt that they result from the physiologic disturbance set in motion by crying and breath holding.

Among the hospital group of eighty-three children, there were three children who previously had had one or more convulsions unrelated to breath holding, and two who went on to develop typical epilepsy. In addition, there were two children with suspected epilepsy in whom the diagnosis could not be established. Abstracts from the histories of these cases are given in Cases 13 to 20. Although the number of cases is too small to allow final conclusions to be drawn, this study nevertheless suggests that the incidence of convulsive disorders is higher among breath-holding children than would be expected in the general child population. Two interpretations are possible: first, that the more severe manifestations of breath-holding spells develop in children who have a predisposition to epilepsy; and second, that breath holding itself may predispose to epilepsy. It is our belief that both mechanisms operate.

An example of constitutional predisposition to cerebral difficulties is to be found in the patient in Case 16. His symptoms were first observed at the age of 7 days when he began to cry vigorously from hunger. Each time he cried, often several times a day, he held his breath, became cyanotic, and went into a short tonic convulsion. Although crying and breath holding disappeared at the age of 6 years, he had several later convulsions without breath holding, epileptic equivalents in the form of unexplained laughing spells, and an electroencephalogram taken at the age of 14 years showed characteristics of epilepsy. It seems clear from the history that this child was born with an imbalance which caused his respiratory and central nervous systems to react in an abnormal way to crying. Such a physiologic imbalance may well be called constitutional, but whether it is due to heredity, to environmental factors operating during intrauterine life,

or to birth trauma, cannot be determined at present. In the present case it seems clear that such a constitutional predisposition contributed largely to the early breath-holding reactions with tonic convulsions and possibly in a similar way to the epilepsy also.

The patient in Case 17 was seen at another hospital and is, therefore, not included in our group of eighty-three cases. His history suggests that breath-holding itself may predispose to epilepsy. This child, whose early development was normal, began to have typical breath-holding spells at the age of 18 months. They soon were associated with general tonic spasms in opisthotonus position. At 2½ years of age the tonic spasms were replaced by generalized convulsions which later began to occur without the preceding crying and breath holding. Typical epileptic attacks of the "drop" type developed at 3 years, and at 12 years of age there was marked mental retardation. The step-by-step progressive course of this patient leads one to suspect that breath-holding spells may set in motion a process which, under certain conditions, continues on into true epilepsy. This is perhaps not surprising in the light of recent observations.

Cerebral anoxemia of newborn infants, drowning persons, and individuals suffering from carbon monoxide poisoning is a well-recognized cause of injury to the nerve cells of the brain. Repeated and severe episodes of cyanosis with breath-holding spells, even though of shorter duration, could theoretically have a similar and cumulative effect. The resulting damage offers a possible basis for an increased susceptibility to epileptic seizures. Furthermore, studies on insulin and metrazol convulsions have demonstrated both clinically and by electroencephalogram that convulsions from whatever cause may be followed by derangements of cerebral functions, and in a severe epilepsy-like pattern in the brain waves.[14] Repeated breath-holding spells with cyanosis and convulsions might, therefore, predispose to later epilepsy both through the damaging effect of the repeated episodes of cyanosis and through a less well-understood effect of the convulsions themselves.

BEHAVIOR ASPECTS

In the great majority of cases, behavior disturbances form an integral part of the breath-holding problem. The frequency with which frustration and anger precipitate breath-holding episodes is clearly appreciated by the mothers of such children. Less obvious but none the less important is the role played by parental attitudes toward the child's behavior and the spells. Misunderstanding and mismanagement on the part of parents undoubtedly encourage a type of reaction in the child which tends to precipitate seizures with greater and greater ease. Thus both in the initiation and continuation of breath-holding spells behavior disturbances play an important part.

The type of child who is subject to breath-holding spells appears to have certain general characteristics of behavior. These are relatively

easy to define since the usual age of onset, less than 18 months, corresponds to a period in life when environmental influences are less complicated than later on. Our observations would indicate that susceptible children are usually of the active energetic type who react vigorously to situations in general. The placid, hypotonic individual, on the other hand, more readily accepts circumstances as they are, so that his emotional reactions rarely rise to a level at which breath-holding spells might be precipitated. Such differences in energy output make their appearance very early in life. They can often be recognized during the first six months, and according to some observant mothers, even in intrauterine life. Stier believes that children with breath-holding spells also show evidences of constitutional irritability or instability of the vasomotor and sympathetic nervous systems. However, accurate observations are difficult to make on small children, and causes are not easily distinguished from effects. While our own observations, which have been discussed under physiology, would in general seem to confirm Stier's belief, our knowledge of the mechanism involved is as yet too meager to allow conclusions to be drawn. While a constitutionally active and aggressive child may be more likely to develop a breath-holding type of reaction to frustration, anger, etc. than his shy and quiet sibling, other factors are undoubtedly more important in determining whether or not symptoms ever arise.

Regardless of constitutional tendencies, it is obvious that anger reactions, which so commonly precipitate breath holding, would not occur unless conditions in the home and surroundings contributed to a frustration of the child's desires. The following descriptions of the circumstances which precede the spells in the hospital group illustrate this and give some idea of the home atmosphere: "he holds his breath to get his own way," "to get attention," "when she is angry," "when he gets a spanking," "when he is displeased or hurts himself," "if something does not go just right," "every time you do something she does not want you to do," "when he is forced to do something he does not want to do," "when playmates take something he wants," "when he is examined by a doctor," "when the doctor did a blood test on her," "when he is frightened," "when he bumps his head." These descriptions which might be duplicated by a similar series from the well-baby clinic suggest that the problems encountered are in no way characteristic of breath-holding spells but point toward such common errors in child training as overindulgence, overcorrection, inconsistency, poor habit training, etc. In general, one might conclude that the behavior situations which precipitate breath-holding spells belong to the group commonly described as "spoiled child reactions."

Such behavior reactions, however, represent merely the acute expressions of more fundamental difficulties. This becomes evident from the occurrence of other complaints than breath-holding spells in the same child. The following case history illustrates this:

G. D. was brought to the Johns Hopkins Hospital at the age of 18 months because of frequent breath-holding spells which were associated with cyanosis and sometimes with unconsciousness.

The family consisted of the father, mother, and an older sister. The father had been an electrician but shortly after the birth of the patient had lost his job and during the business depression of 1933 had been forced to accept ordinary laboring work which was irregular and uncertain. He was subject to temper outbursts and drank moderately. During the patient's early years, the income of the family was never secure. The mother, who was ten years younger than the father, described herself as being "very nervous, easily upset, and could scream" when things did not go right. Both parents were from Catholic families but had turned Protestant. The sister stammered when embarrassed, for which she was scolded and punished. The patient was born twelve months after her sister. Throughout pregnancy the mother continued to feel ashamed of the fact that she was to have another child so soon.

The patient had always been difficult to manage, and "had a nasty disposition" in sharp contrast to the sister. She had frequent temper tantrums, was fussy about her food but was forced to eat, slept poorly with grinding of teeth and restlessness, bit his finger nails, and demanded attention. She was given a pacifier to suck whenever the mother became annoyed with her behavior. At the age of 18 months she began to have breath-holding spells, precipitated by temper or minor injuries, which often occurred several times a day. They were associated with cyanosis, unconsciousness, and stiffness of the body which the mother interpreted as convulsions. Both the mother and grandmother were greatly alarmed by the spells which often recurred several times a day. They allowed the child to have her own way in the hope of preventing recurrences.

Since the family seemed unable to handle the situation at home, the child was admitted to a convalescent home where she remained for five months. At first she was solitary, silent, and resentful and continued to have breath-holding spells. Gradually, habits, behavior, and disposition improved and the breath-holding spells faded away. After returning home to an unchanged family atmosphere, the spells recurred but less frequently than before. Violent temper tantrums, however, were not uncommon. When the child was 5 years of age, the mother became sick, and had to be away from the home. During this period the household was managed by a friend who immediately adopted the policy of ignoring the breath holding and temper outbursts. After a few abortive spells, the child's disposition improved markedly, and she has been a pleasant, agreeable person since. When seen at the age of 10 years she appeared normal both physically and emotionally.

Similar observations have been reported by Stier, Kanner, and others and emphasize the importance of considering breath-holding spells as a symptom rather than a disease in its own right.

While the personality difficulties of these children are in large measure an expression of parental attitudes and child training, the breath-holding episodes themselves frequently add to the picture. Because of the alarming nature of the symptoms, the parents immediately become more anxious and protective and try to satisfy every desire of the child in order to prevent a recurrence. Having accomplished his purpose of securing attention, the child continues to react in the same way or more violently on subsequent occasions. Once started, therefore, a cycle becomes established in which the attacks provoke parental anxiety, and the parental anxiety encourages the behavior

problems which precipitate the attacks. Such a cycle is seen frequently in those children whose breath-holding episodes are initiated by anger reactions.

In children whose breath-holding spells are precipitated by fear and pain, the initial behavior disturbances may be relatively mild and the physiologic disturbance of more importance. As time goes on, however, the anxiety and solicitude of the parents encourage the same type of difficulty as that described in the preceding paragraphs. As Stier has pointed out, even though fear and pain are the precipitating factors in the initial episodes, as time goes on temper reactions gradually become the more usual stimuli.

OUTCOME

Since breath-holding spells are common in early childhood and unknown in adults, it follows that all children "outgrow" them sooner or later. It is of interest to know at what age the reaction disappears and what associated symptoms, if any, tend to persist. No satisfactory data are available concerning the age of cessation of the mild breath-holding spells seen so commonly in small children. The material from the well-baby clinic contributes little to our knowledge because so many of the children are still very young and have not been observed for a sufficiently long period. It can be tentatively stated, however, that in the great majority of cases the attacks will occur at longer and longer intervals and come to a close before the completion of the third year of life.

Somewhat more detailed information is available concerning children with breath-holding spells who have come under medical care for one reason or another. Stier was able to obtain data on twenty-seven of twenty-nine children who came to a hospital for various reasons but were found incidentally to have had breath-holding spells. Four-fifths of these children had outgrown their spells before the end of the sixth year, and only one case persisted to the age of 12 years. In all instances the cessation came about gradually. Stier points out that although the spells themselves disappear, the underlying pathologic physiology may persist and be evident in a variety of ways. Five of his patients had later syncopal attacks, four had reactions of rage which were intermediate between faintings and convulsions, five had convulsions induced by fever, etc., one developed true epilepsy, and one had unexplained laughing attacks. These cases were observed for periods of from 1 to 7 years.

Kanner has studied the personality problems of children who had had breath-holding spells previously. He was impressed with the fact that behavior disturbances persisted after the breath-holding itself had disappeared and pointed out that the home setting in such instances contributed to the difficulties.

Of our own group of eighty-three children who had been brought to the hospital for breath-holding spells, fifty-one could be included in a *follow-up study*. In the great majority of these cases it was possible to call in and re-examine the former patients, but in a few instances an interview with a member of the patient's family or information by letter had to be substituted. Of these fifty-one children, forty-seven were still living at the time of follow-up, four had died of causes apparently unrelated to breath holding. The families of thirty-two of the original patients had moved away and could not be located in spite of all efforts made in that direction.

The average age of the fifty-one individuals included in the follow-up study was 2 years when they were first seen at the hospital and almost 11 years at the time of interview (or death). They had thus been under observation for an average period of almost nine years which lends an element of finality to the findings. The available data indicate that in our material the breath-holding spells disappeared at an average age of 3 years and 8 months. The individual cases, however, were scattered over a wide range in this respect,* and in one-fourth of the children in the group the attacks persisted well into the sixth year of life. Practically all children, however, had outgrown the habit before entering school.

According to the reports received, there were sixteen among the fifty-one children in the follow-up study, or one-third of the total number, who presented behavior problems at some time during the period of observation. In the light of our general impression and certain still unpublished investigations on the incidence of behavior problems among normal children this is certainly not a high proportion. There was nothing typical about the kind of disturbances encountered which included temper tantrums, enuresis, hypochondriacal complaints, pica, etc. As mentioned earlier in the section on pathologic physiology there were three children who had had convulsions unrelated to breath-holding in infancy, two who developed typical epilepsy, and two others in whom epilepsy is suspected but cannot be definitely established (Cases 13 to 16 and 18 to 20). The possible implications of these findings have already been discussed.

Why do breath-holding spells tend to disappear after a few years? The reason would appear to be related to changes in the child's habits which affect the precipitating factors—behavior disturbances and violent crying. Without such an initiating mechanism, the spells cannot develop and the abnormal sensitization of the respiratory apparatus is gradually lost. As mentioned above, the usual age of disappearance is from 3 to 6 years, which corresponds roughly to the age at which violent crying becomes a less common mode of expressing anger, pain, fear, etc. To "outgrow" breath-holding spells, therefore, means in reality to outgrow the habit of violent crying. It should be added that

*Coefficient of variation, 47.

strictly speaking, the age of crying should be in terms of mental age or maturity rather than physical or chronological age. Breath holding seems to be more common in mentally retarded than in normal children and also to begin later and to persist longer in the retarded than in the normal individuals. More than one-fifth of the children in the hospital group was classified as retarded either at the time of the attacks or later in the follow-up study or on both occasions. In the absence of more accurate psychometric ratings it is impossible to say just how much this proportion exceeds the expectation in a sample of the general population. Table V shows the average age of onset and of disappearance of breath-holding spells in the retarded children as compared to the normal ones. The former began to have them about five months later and stopped having them about ten months later. It must be admitted, however, that these averages are based on too few cases to be statistically conclusive.

TABLE V

AVERAGE AGE AT ONSET AND AT DISAPPEARANCE OF BREATH-HOLDING SPELLS IN RETARDED AND NORMAL CHILDREN

	ONSET (MO.)	DISAPPEARANCE (MO.)
Retarded children	15.8	51.6
Normal children	10.6	41.9
Difference	5.2	9.7

Although age undoubtedly contributes to the cessation of breath-holding spells, changes in the child's surroundings may affect the crying and therefore also the disappearance of the spells. From the viewpoint of therapy, this aspect is of particular importance. Among the children in the hospital, there were four whose breath-holding spells stopped abruptly following a temporary separation from the home environment and re-education of the parents in methods of child training. In others the changes were less dramatic but none the less clearly related to improvement in the home setting. Not infrequently these changes may proceed without outside suggestion, and under such circumstances the breath-holding reaction disappears "spontaneously." We are inclined to believe, therefore, that cessation of breath holding results either from a modification of the environment which alleviates the behavior problems and minimizes the crying of the child or from growth of the child to an age when crying becomes an uncommon mode of expression. It seems likely that in some children a physiologic instability may persist, but data are not available to indicate whether or not this is continued beyond the age of puberty.

TREATMENT

In the light of the observations on the interrelationships between parental attitudes, child's behavior, and pathologic physiology, it is not difficult to plan treatment for children with breath-holding spells.

As soon as the beginning of the breath holding can be recognized by the parent, the child should be placed in a horizontal position to prevent an accident from falling and to improve the cerebral circulation. As the phase of recovery becomes evident he may be safely left to take care of himself without fear or anxiety. The parent should be encouraged to display an attitude of purposeful neglect to prevent the child from acquiring satisfaction and from using the breath-holding spells as a means of dominating the family. Most important from the standpoint of prevention is an attitude of quiet, confident firmness on the part of the parents whenever questions of behavior arise. Indulgence, undue severity, inconsistency, and poor habit training are to be avoided. If this advice is combined with reassurance that the spells themselves are rarely harmful to the child and that the outlook is usually good, most parents will be able to cope with the situation satisfactorily. In some cases, however, the continuation of the breath-holding spells is dependent upon excessive anxieties and apprehensions on the part of the parents. Under such circumstances effective treatment depends on an understanding of the personalities in the home which opens the way toward more wholesome relationships and toward a better functioning of the family. Occasionally the breath-holding reaction may be set off by such slight incidents that admission to the neutral atmosphere of a hospital or convalescent home may be necessary for a short period. This will also provide an opportunity for education of the parents regarding better management after the child returns home. Drugs appear to be of no value in treatment of the ordinary breath-holding reaction and tend to direct attention away from the more important question of the underlying behavior difficulties. The convulsions, if they occur, require little attention and rarely last long enough to allow more than the insertion of a mouth gag to prevent injury to cheek or tongue. In rare instances, however, they may be prolonged beyond twenty to thirty minutes, and under such circumstances the administration of a sedative or even a brief period of anesthesia may be justified as in the case of prolonged epileptic seizures. The common practice of throwing cold water into the child's face is probably unnecessary and should be avoided.

The problem of treating the child whose breath-holding spells have been induced by pain without apparent anger is a most difficult one because in these cases the major disturbance appears to be one of pathologic physiology rather than behavior. By insisting on a restricted activity program, the chances of painful accidents can be only slightly reduced. As the child grows older, a discussion of the mechanism in simple terms may enable him consciously to avoid holding his breath when hurt. A well-balanced diet with a general hygienic living regime may contribute somewhat toward vasomotor stability. In spite of efforts, some individuals will go through life with more delicate syncopal reactions to pain than others but are handicapped little if at all.

SUMMARY

Breath-holding spells are frequent occurrences during the first years of life. In most children the attacks are mild and are outgrown as crying becomes a less common mode of expression. In some, however, the episodes are associated with cyanosis, unconsciousness, and convulsions and may require medical care. Frustration and anger are the usual precipitating circumstances, pain and fear being less common causes. Disturbances of behavior resulting from poor habit training and parental attitudes form a background in most instances. In addition to these external factors a sensitized respiratory apparatus and vasomotor instability contribute to the pathologic physiology of the condition. The general outlook for children with breath-holding spells is good, although in a few of our cases epilepsy developed later.

Diagnosis Doubtful, Probably Epilepsy:

CASE 1.—W. H. Birth was normal. At 9 months of age he began having spells which were described as follows: "Without apparent cause he holds his breath until he gets blue in the face and his legs and arms get stiff. Sometimes his mouth is drawn to the left side." At first he had a spell every two or three weeks; gradually the frequency of the spells increased until at the age of 15 months they occurred from two to four times a day. He was not seen again until 17 years of age. At this time he was well in every respect. The mother stated that he continued to have the spells until he was about 5 years old. They gradually decreased in frequency and finally disappeared completely. An electroencephalogram taken at the age of 17 years showed fairly stable adult pattern under resting conditions, but after three minutes of hyperventilation bursts of irregular waves, three to five per second, appeared.

CASE 2.—B. C. He was first seen at the clinic when 15 months old because of breath-holding spells. His birth was normal. The parent reported only two spells. The first spell, occurring at the age of 14 months, was described as follows: "Baby was playing and suddenly got stiff and rigid, becoming blue in the face, falling into the mother's arms. He did not cry or thrash about." After the mother sprinkled him with water, he caught his breath and cried. The second, occurring three weeks later, was similar to the above. The diagnosis in this case was not clear.

CASE 3.—S. W. Birth was one month premature but otherwise normal. When he was 10 months old he began having spells consisting of sudden loss of consciousness during which he rolled his eyes upward, retracted his head, and became limp all over. The spells lasted several minutes, after which he was dazed and pale for about fifteen minutes. During the following three months he had six more similar episodes. On two occasions the mother noticed that the child struck his head just prior to a spell. At the age of 2 years, the grandfather, who is a physician, reported that the patient's general condition was good and that he seemed to be developing in a satisfactory manner. However, he was continuing to have spells. Although the mother states that the spells were precipitated by a fall or a fright, the physician still considered epilepsy a possibility.

Breath-Holding Spells of Usual Pattern:

CASE 4.—P. B. At the age of 2 months he began to have spells of breath holding and became blue in the face whenever anything displeased him or made him cry. At first such spells occurred about once a month, but they gradually in-

creased in frequency until at the age of 1 year he was having three or four attacks a day. The mother was oversolicitous and fearful of the attacks. She frequently carried a glass of water with her so as to have it ready to pour on him in case a spell should develop. When he was 3 years old the mother consulted a physician and was given advice concerning the management of the child and the spells. Following this the breath-holding episodes gradually faded away. When last seen at the age of 14 years, he was well and had had no attacks since the age of four.

CASE 5.—H. E. The patient's birth was normal. Both of her parents had been treated for psychoneurosis. When she was 2 or 3 months old she began having spells of "holding her breath, rolling her eyes back into her head, and stiffening out." These occurred mainly while passing hard constipated stools and disappeared at the age of 4 years. Since then she had had episodes of awaking at night, screaming, abdominal pain, and vomiting which recur about once a month. Temper tantrums were also frequent occurrences. An electroencephalogram at the age of 9 years showed no signs of epilepsy.

CASE 6.—S. D. At the age of 7 months he developed spells consisting of breath holding, cyanosis, and unconsciousness. In them he remained unconscious for several minutes and was always drowsy and sleepy afterwards. They were brought on by anger or minor injuries. At the onset the attacks occurred infrequently, but during the course of the following three months, they came on about once a day. The spells continued in spite of cooperative efforts on the part of the parents to treat the child at home. When 5 years old, he was sent to a convalescent home for children where he remained for about nine months. During the first few weeks there he had several breath-holding spells, after which they completely disappeared. He continued to do well upon returning home and when last seen at the age of 9 years was entirely well.

CASE 7.—K. E. Birth and development were normal. When he was 20 months old the mother stated that she spanked him following which he began to cry, became blue in the face, and went into a generalized convulsion which lasted about a minute. During the course of the subsequent months he had several more convulsions which were precipitated by spanking, fright, or a minor injury. He was admitted to the hospital for study at the age of 21 months. While there he had numerous short convulsions precipitated by being forced to do things which he resented. One typical spell occurred during preparations for a lumbar puncture; during another, which was precipitated by an attempt to force him to drink orange juice, carpopedal spasm was observed. Physical and laboratory examinations were negative. He continued to have frequent attacks for another year. When last seen, at the age of 5 years, he was attending kindergarten and seemed entirely well.

CASE 8.—C. C. Birth and development were normal. At the age of 13 months she began having frequent breath-holding spells precipitated by fear or slight injuries. The spells progressed to cyanosis and unconsciousness which lasted from one to two minutes. At 19 months of age she suddenly held her breath, fell to the floor limp and unconscious, and soon went into a generalized convulsion which lasted an hour. This was terminated by a general anesthetic. Although admitted to a hospital where she stayed for a week, no further explanation of the condition was found. Later reports were not available.

CASE 9.—G. J. The child was well until the age of 5 months when he developed breath-holding spells which came on "when he did not get his own way." The spells consisted of breath holding, cyanosis, and unconsciousness and lasted about two minutes. He was always sleepy and drowsy afterward. They recurred once or twice weekly. At 11 months he had a typical breath-holding spell followed by a

generalized convulsion lasting fifteen minutes. At 16 months a similar episode was followed by a convulsion which lasted over an hour and was terminated by anesthesia. Several more simple breath-holding spells occurred during the subsequent three months, but when last seen at the age of 9 years, he had had no spells for seven years.

CASE 10.—M. P. When the patient was 11 months old she contracted whooping cough and showed the usual features of paroxysmal cough, cyanosis, whooping, and vomiting. After the pertussis improved, she had attacks of holding her breath, cyanosis, stiffness of the body, rolling of eyes backward which were brought on "by not doing as the child desired." These recurred about every other day for a period of five months; there was a remission of about one month following which the spells returned again. When last seen at the age of 19 months, she was still having breath-holding spells.

Breath-Holding Spells With Vagotonia:

CASE 11.—U. M. This child was first seen at the age of 15 months because of "choking spells and convulsions." Six months previously during whooping cough she began to hold her breath, with cyanosis and stiffening of the body associated with paroxysms of coughing. After the whooping cough subsided, she continued to have typical breath-holding spells almost daily—whenever she became angry or hurt herself. In them she would cry violently, hold her breath, become quickly cyanotic, the eyes would roll up, and the body would stiffen into the opisthotonos position. Suddenly "something would burst" and she would become limp and exhausted, often sleeping for from three to four hours. The mother had noticed that during the breath-holding phase the heart rate was very slow, becoming rapid after the relaxation. Shortly before admission to the hospital the tonic phase was followed on two occasions by clonic convulsions which lasted about two minutes. General behavior problems had become increasingly acute as the mother tried to maintain discipline but was continually afraid of thwarting the child's wishes for fear of precipitating an attack.

Examination showed a fearful, aggressive, antagonistic child, who was sullen and resentful even when not disturbed. During the physical examination, she struggled, cried violently, held her breath, and within ten to fifteen seconds was severely cyanosed. During this time the heart rate became very slow but did not actually stop. During recovery the rate was abnormally rapid. Pressure on the eyeballs (oculocardiac reflex) resulted in similar changes in heart rate.

Laboratory examinations showed a fasting blood sugar of 52 mg. per cent. Blood calcium, phosphorus, and phosphatase were normal. Epinephrine injections caused normal changes in pulse rate and blood sugar level. Electroencephalogram showed a degree of large four-per-second activity that was considered somewhat abnormal for the age of 15 months.

Following separation from the home, there was rapid improvement in the behavior with a parallel decrease in the frequency of the breath-holding spells. When last seen at the age of 30 months she was happy and well behaved. However, on several occasions following painful injuries she had had breath-holding spells, and in one of these a short convulsion had followed.

CASE 12.—M. C. The patient was well over 3 years of age when he had his first attack. This spell began with a fright and was characterized by crying, breath holding, cyanosis, stiffening of the body, and unconsciousness lasting for several minutes. During the course of the following year he had four others, all of which were essentially the same and were precipitated by a fright or minor injuries. Physical examination at the age of 4 years was negative except for evidence of vagotonia as demonstrated by the marked slowing of the heart rate when

pressure was applied to the eyeballs (oculocardiac reflex). He was not seen again until the age of 6 years. No further seizures had occurred but he was described by the parents as being nervous, easily frightened, and having frequent nocturnal enuresis. The oculocardiac response was again elicited. Mild pressure on the eyeballs stopped the heart beat for about 20 seconds, the cheeks became flushed, and he appeared unconscious for about one-half minute after the heart started to beat again.

Breath-holding Spells With Unexplained Convulsions:

CASE 13.—S. M. The child was born one month prematurely but was otherwise normal. At the age of 9 months, she began to have frequent spells consisting of breath holding, cyanosis, and unconsciousness. They were always preceded by fright. They disappeared after the age of 4 years. At the age of 2 years she had three generalized convulsions associated with dysentery and high fever. When seen at the age of 18 years she appeared normal and healthy in every way.

CASE 14.—P. J. Birth was normal. He had a "convulsion with indigestion" at the age of 3 years. When first seen at this clinic at the age of 6, he was obviously mentally retarded. There was a history of spells which began at the age of 5 and were described as follows: "Whenever he is reprimanded or gets whipped he holds his breath, gets blue in the face, draws his head backward, arches his back, and then gets stiff all over." The spells usually lasted about two or three minutes and recurred three or four times a month. Follow-up data were not available.

CASE 15.—R. C. The patient was born at term by breech extraction and is reported to have been a normal child. At 3 years of age he had two generalized convulsions associated with fever and acute bronchitis. The bronchitis lasted for several months. During this period the patient began to have spells which were characterized by breath holding, cyanosis, and convulsive movements. They were initiated by anger and pain and lasted about three minutes. During the following nine months the patient had on the average one such spell each week. He was seen again at the age of 7 years and gave a history of having had no spells during the preceding three years. At 12 years of age he was well in every respect.

Breath-Holding Spells Progressing to Epilepsy:

CASE 16.—N. N. The mother nursed him for seven days while she was in bed and he gained weight satisfactorily. As soon as she returned to her household duties, the milk supply dwindled and the baby began to cry from hunger. With each crying spell he "held his breath, turned blue, trembled all over," but revived almost immediately after taking a deep breath. For the following two years he continued to have such spells every time he cried which was usually one to three times a day. On most occasions the crying was initiated by pain, fear, or hunger. After the age of 2 years, the crying became a less frequent occurrence and correspondingly the spells became rare, only when he fell and hurt himself. He continued to have occasional breath-holding spells until the age of 6 years when he was started on daily phenobarbital medication. Although this was continued for only eighteen months, he remained free from seizures for six years. At the age of 12 he had a generalized convulsion lasting several minutes, which followed a fight with other boys. Electroencephalogram at this time showed no definite evidence of epilepsy. Medication was resumed. When he was 13 years old he began having episodes of unexplained outbursts of laughter which sometimes lasted from thirty minutes to one hour. They recurred two or three times a week. There was definite improvement when benzedrine was added to the phenobarbital which he had been

taking. An electroencephalogram taken at the age of 14 years showed a definite epileptic pattern.

CASE 17.—G. A. This child was well and healthy until the age of 18 months when she developed breath-holding spells. These were characterized by cyanosis, opisthotonos, and unconsciousness lasting about five minutes and occurred when she cried for any reason whatsoever. At the age of 30 months the breath-holding episodes reached a climax in generalized convulsions. Several months later the abnormal reactions to crying disappeared but she began to have nocturnal convulsions. From the age of from 3 to 9 years so-called "drop" or "Salaam" seizures occurred several times a week in addition to less frequent nocturnal convulsions. After the age of 9 years, prolonged convulsions sometimes lasting up to three hours occurred, and mental retardation became marked.

CASE 18.—Z. P. This patient weighed 4.5 pounds at birth, but otherwise was normal. Both mother and a maternal aunt had "fainting spells." When 4 months old he began having frequent spells consisting of breath holding and cyanosis whenever he did not get what he wanted. These continued until 10 months of age. At 4 years he began having typical grand mal epilepsy and continued to have frequent convulsions until he died at the age of 9 years. At 7 years he was sent to a custodial institution because of marked mental retardation and frequent seizures.

Breath-Holding Spells Followed by Possible Epilepsy:

CASE 19.—C. D. The patient weighed three pounds at birth but otherwise was normal. When he was a "small baby" he had breath-holding spells associated with crying and marked cyanosis. They came on when his wishes were not complied with or when he hurt himself. The spells continued until he was 5 years old when they were superseded by "staring spells" suggestive of petit mal epilepsy. When last seen, at the age of 17, he was still having spells which the mother called "daydreaming and blank spells." However, the description did not seem sufficiently definite to permit a diagnosis of petit mal epilepsy. An electroencephalogram done at this time showed no signs of epilepsy during rest or hyperventilation.

CASE 20.—D. E. Birth and development were essentially normal. A paternal aunt had epilepsy. When the patient was 9 months old, immediately after recovering from bronchopneumonia, she began having frequent spells consisting of crying loudly, holding her breath, turning blue in the face, and becoming stiff all over. The spells always occurred when her wishes were not complied with or following slight trauma. She had an average of one spell weekly the following four years but thereafter the spells disappeared. When she started school at 6 years of age, the teacher noticed that she acted queerly, talked incoherently at times, and had staring spells. The staring episodes increased in frequency and when last seen at the age of 11 years, the mother stated that she was having about one such spell each day. She was also doing poorly at school and had failed several times. An electroencephalogram done at this time was normal.

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CONCURRENT MENINGOCOCCAL MENINGITIS AND SALMONELLA BACTEREMIA

ERWIN R. NETER, M.D.
BUFFALO, N. Y.

DURING recent years our knowledge of Salmonella infections in man has increased considerably. It is obvious that an adequate understanding of the clinical and epidemiologic features of Salmonella infections can be attained only if the type of microorganism involved is determined. The genus Salmonella is comprised of more than thirty antigenically different types, a fact which renders the bacteriologic diagnosis of these infections more difficult.

Of the members belonging to group C, *Salmonella cholerae suis*, sometimes referred to as *Salmonella suipestifer*, is particularly important. It is worthy of note that infections with this organism may accompany or follow other diseases such as pneumonia, streptococcal pharyngitis, scarlet fever, rheumatic heart disease, epidemic meningitis, gonorrhea, or surgical procedures (Harvey[1]). It seems likely that the simultaneous presence of the two diseases is not merely a coincidence. Concurrent infections raise additional diagnostic and therapeutic problems. Recently at this hospital a case of meningococcal meningitis and *S. cholerae suis* bacteremia was observed and studied from the clinical, bacteriologic, and immunologic point of view. The pertinent data is herewith presented:

M. A. G., a white female 7 years of age, was admitted to the Children's Hospital on April 16, 1943. According to the past history, she had had measles and chicken pox. For approximately four weeks prior to admission she was suffering from a cough. On the day preceding admission she complained of headache, dizziness, vomiting, and stiffness of the neck. She was a poorly nourished child. The important findings were opisthotonos, marked rigidity of the neck, positive Kernig's sign, and petechiae on abdomen and elbows. Her temperature on admission was 100° F. A spinal tap was performed, and cloudy spinal fluid was obtained. The spinal fluid contained approximately 5,000 leucocytes, polymorphonuclear cells predominating. The glucose content of the spinal fluid was reduced, and globulin was present. The microscopic examination revealed the presence of gram-negative diplococci. On culture, a pure growth of meningococcus was obtained.

A routine blood culture was taken April 17, 1943. A pure growth of a motile, gram-negative bacillus was obtained. This organism grew well in infusion broth and on Endo agar, produced acid and gas from glucose, failed to form acid from lactose and sucrose, and did not cause indole formation. Dr. E. Seligmann kindly studied this strain and identified it as *S. cholerae suis*.

Blood cultures were again taken April 22 and 23. The former revealed five colonies of *S. cholerae suis* per 1 ml. of blood, while the latter remained sterile. Several attempts were made to determine whether or not the paratyphoid bacillus was present in the feces. Three stool cultures failed to reveal this organism.

From the Children's Hospital and from the Department of Bacteriology and Immunology, University of Buffalo School of Medicine.
Part of an investigation on Salmonella infections supported by the Statler Trust.

The antibody response of the patient was investigated. On April 23, 1943, the patient's serum agglutinated *S. cholerae suis* in dilutions up to 1:1,600. The agglutinin titer on April 29, had decreased to 1:200.

The patient was given 2 Gm. of sulfathiazole by mouth shortly after admission and then 0.5 Gm. every four hours for seven days. On the fourth day after admission the temperature returned to normal and remained so until May 7, at which time the patient was discharged, cured of meningococcal meningitis and Salmonella bacteremia.

DISCUSSION

The above-reported case represents an instance of the simultaneous occurrence of two different bacteriologically proved infections; namely, Salmonella bacteremia and meningococcal meningitis. It resembles the case reported by Ravitch and Washington.[2] Their patient was admitted with meningococcal meningitis. The initial blood culture revealed a pure growth of meningococci. Subsequent blood cultures, however, yielded *S. suipestifer*. It is interesting to note that, possibly dependent on gross contamination of the cerebrospinal fluid with blood in the course of lumbar punctures, suipestifer meningitis developed. In our patient this complication did not occur. Furthermore, in the above-reported case the initial blood culture revealed *S. cholerae suis*. Of course, it is impossible to state whether or not meningococci were present in the blood at that time and escaped detection because of the presence of the profusely growing gram-negative bacillus. It is noteworthy that there were no symptoms of, or signs pointing to, a complicating Salmonella bacteremia. The blood stream infection with *S. cholerae suis* lasted for six days. It cannot be stated whether or not chemotherapy contributed to the disappearance of the paratyphoid bacillus.

It has been shown by several investigators in the past and confirmed by Ravitch and Washington that suipestifer infections commonly are accompanied by mild granulocytopenia. Once localization of the infection occurs, leucocytosis usually develops. In the case reported above the leucocyte count on admission was 31,000, and rose to 55,000 on the following day. Subsequently, it decreased to 7,800 on April 21, to 3,700 on April 22, and to 2,300 on April 23. Later the leucocyte count returned to normal and amounted to 8,300 on April 29.

The presence of specific agglutinins in the blood of the patient is additional proof of the pathogenic significance of this organism. As in the case of Ravitch and Washington, the antibody titer was rather high. In the latter case the titer of agglutinins on the twenty-first day was 1:80, and it reached 1:2560 on the forty-second day. In the above reported case, on the other hand, the agglutinin titer reached 1:1600 on April 23, six days after the first positive blood culture was taken. Whether this represents the seventh day of the illness or whether the Salmonella infection was present during the preceding period cannot be ascertained, although this seems to be quite unlikely.

There can be little doubt that Salmonella infections occur more frequently than is generally realized. It is evident that the diagnosis of

Salmonella bacteremia in the above-reported case was made only on the basis of a routine blood culture. It appears possible that the meningococcal infection contributed to the development of the Salmonella bacteremia, although it must be admitted that this is only a conjecture. Then it must be assumed that the patient was a carrier of the paratyphoid bacillus. As usual, examination of the feces failed to reveal the presence of this organism. The problem of Salmonella carriers deserves further attention.

SUMMARY

A case of meningococcal meningitis and *S. cholerae suis* bacteremia is presented. Specific agglutinins in high titer against the paratyphoid bacillus developed in the course of the illness. Complete recovery followed the use of sulfathiazole. The relationship between the two infections is discussed.

I wish to express my sincere appreciation for the identification of the culture to Dr. Erich Seligmann, Beth Israel Hospital, New York, N. Y.

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JEJUNAL INTUSSUSCEPTION

Report of a Case in a Six-Day-Old Infant

Edwin Paul Scott, M.D.
Louisville, Ky.

INTESTINAL obstruction in the neonatal period is unusual, and it has been estimated that it occurs in about one of every 20,000 newborn infants. Of the causes of intestinal obstruction in the newborn infant, one of the most unusual is intussusception.

The first successful operation for intussusception in the neonatal period was reported by Dowd (1913).[1] Lewis (1939)[2] reviewed the literature and reported the thirteenth case of intussusception in the newborn infant and the first jejunal intussusception.

The mortality of intussusception in the newborn infant is exceedingly high, and if one is to save an infant's life, the diagnosis must be made immediately after the onset of symptoms. The picture of intussusception in the newborn infant is one of vomiting, extremely rapid loss of weight, abdominal distension with pain and a palpable mass, and bloody stools. Immediate operation for the relief of the intussusception is imperative, but the postoperative care seems to be of almost equal importance for survival of the infant.

This case seems to be of sufficient rarity to record in the medical literature:

A colored female infant was delivered by cesarean section under cyclopropane anesthesia, June 16, 1942, at the Louisville General Hospital, the indications for a section being uncontrollable convulsions due to a severe toxemia of pregnancy in a 17-year-old primipara. The approximate term was Aug. 1, 1942. At delivery the infant apparently aspirated an abundance of mucus and amniotic fluid, as a considerable amount was sucked from the nose and throat in resuscitating the baby. Immediately following delivery, the infant was profoundly cyanotic, and the heart was extremely slow. Intravenous coramine and oxygen were used, to which the infant responded slowly. When the infant arrived in the nursery, she was given synkamin intramuscularly and continuous oxygen and the foot of the crib was elevated. The birth weight was 2,798 gm. (5 pounds and 13¼ ounces).

After the usual starvation period of twelve hours, she was given 10 c.c. of breast milk every three hours. This was well taken until the second day of life when it was vomited for the first time, which was approximately thirty-two hours after delivery.

On the third day she was sent to the breast and vomited one of the feedings. The following day, June 19, 1942, believing that considerable mucus might have been swallowed during the delivery, the stomach was lavaged with 200 c.c. of weak soda bicarbonate solution. Her weight had now dropped to 4 pounds and 14 ounces. In spite of subcutaneous fluids, gastric lavage, etc., the baby continued to vomit greenish material intermittently. On the morning of June 20, when the baby was

From the Department of Pediatrics, University of Louisville School of Medicine.

83 hours old, she had a dark bloody stool which was the first time this had been noted, all others being apparently normal. A blood dyscrasia was considered, but the bleeding and clotting times were normal, and the red blood count revealed 3,300,000, with 13.5 gm. of hemoglobin per 100 c.c. of blood. The white blood count was 9,700 with a differential of 74 per cent polymorphonuclear leucocytes, 22 per cent lymphocytes, and 4 per cent myelocytes. Additional subcutaneous fluids were given along with 50 c.c. of citrated blood intravenously.

It was then thought that this might be a congenital atresia or an intussusception; however, an upright film of the abdomen revealed gaseous distension only. The bloody stools continued but the blood became much brighter. Rectal and abdominal examination by members of both the surgical and pediatric staffs was interpreted as "negative."

Fig. 1.—Intussusception of jejunum.

The next day, June 21, a barium mixture was given by mouth which revealed barium in the small intestine at the end of eighteen hours. On the morning of June 22 barium was noted in the stools, but at the same time the baby began to vomit greenish brown material with a fecal odor. At this time an exploratory laporatomy was decided upon.

With continuous fluids being administered, the infant was given an ether anesthetic and through a transverse incision the abdominal cavity was explored. An intussusception was found in the jejunum with about 5 cm. of bowel being invaginated, which had already become gangrenous and eroded at its tip (see Fig. 1). Resection was carried out by doing a lateral jejunojejunostomy. Toward the completion of the operation the patient repeatedly ceased to breathe and became

cyanotic numerous times. Continuous oxygen, stimulants, and artificial respiration finally succeeded in restoring a rather poor respiratory rhythm and fairly good color.

Postoperatively the infant was given continuous oxygen, fluids, and 5 per cent sodium sulfathiazole solution intravenously, plasma, and daily blood transfusions, but in spite of this, the patient continued with intermittent cyanosis. Small amounts of fluids were given by mouth without vomiting, and there were several small stools postoperatively.

The cyanosis became worse on the baby's thirteenth day, and the infant expired on June 29, the seventh postoperative day.

This is believed to be the fourteenth case of intussusception reported in a newborn infant and the second of jejunal intussusception.

CONCLUSIONS

Jejunal intussusception in a 6-day-old infant is herein reported.

Intussusception is extremely rare in the newborn period but should be considered in any child who is vomiting and passing blood per rectum.

I wish to express my appreciation to Dr. Joseph E. Hamilton for performing the surgical operation and to Dr. A. J. Miller of the Department of Pathology for his cooperation in presenting this paper.

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AN "IMPROVED" CONSULTANT'S CASE FOR PEDIATRIC PHYSICIANS*

REGINALD A. WILSON, M.D.
VANCOUVER, B. C.

THE traditional physician's bag as available in its various forms from medical supply houses has very little to be said for it from the viewpoint of the practicing pediatrician. Usually these "doctor's bags" conform to a classical design which is seldom functional. Inevitably, when filled with the impedimenta of our craft, the interior of these

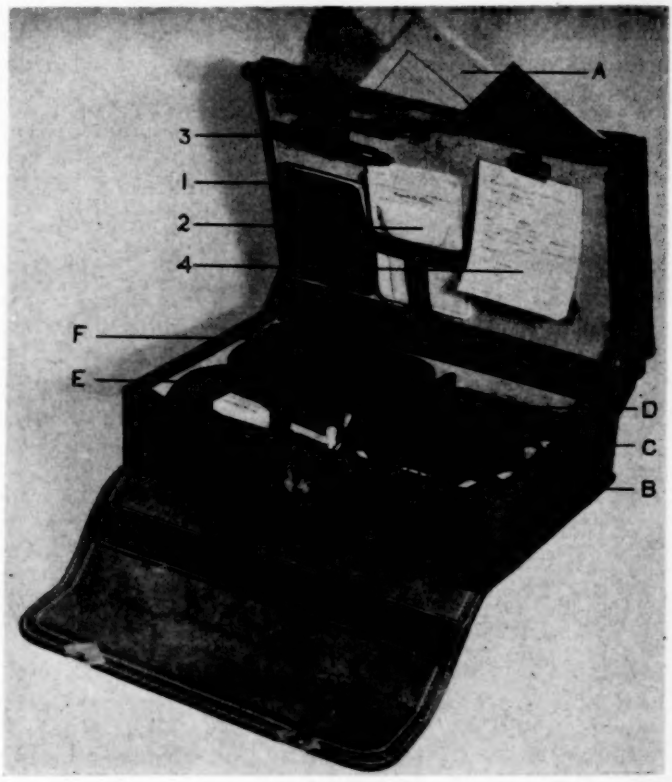

Fig. 1.

bags becomes a disordered shamble of bottles, instruments, serums, stethoscope, and a variety of other loose articles. Such confusion is not only a waste of our time, but it detracts from the desirable appearance of neatness and efficiency.

*Supplied to the author's specifications by Henry Birks & Sons, Vancouver.

Fig. 1 shows a combined carrying and dispatch case which has been modified for use in the practice of pediatric medicine. It will be noted that at *A* there are spaces suitable for carrying such necessary papers as diet sheets, medical history forms, special printed instructions, the current medical journal, or personal papers. At *B* a series of bottles is held in place by leather straps. These can be labeled to carry such articles as gauze, bandage, and cotton. In the smaller bottles, *C*, alcohol and such drugs as phenobarbital or sulfathiazole may be kept. Section *D* is made to hold an instrument case containing an auriscope, ophthalmoscope, applicator, and ear instruments. The compartment, *E*, provides spaces for two leatherette cases, one to contain hypodermic drugs and ampoules for injection or intravenous use, the other to contain syringe and needles. Stethoscope, reflex hammer, and such articles can be kept here. At *F* there is space for a sphygmomanometer, ready reference book, or hemocytometer.

On the inner surface of the lid it will be seen that leather bands are attached to provide carrying compartments for the following:

1. A pharmacopoeia or handbook
2. A prescription pad or printed formula sheets
3. Thermometer and diagnostic pen light
4. A memorandum pad

Such a carrying case provides sufficient space for all necessary articles and allows for their orderly retention in easily accessible compartments. When opened on its side on a table in the home it shows an appearance of neatness which is consistent with the dignity of our profession.

Erratum

In the article by Berkley and Colby entitled "Problems in Safeguarding Adoptions," which appeared in the September issue of the JOURNAL, the following material was omitted from the manuscript submitted for publication. The authors desire to have this material added. It should be inserted after the twentieth line on page 349.

It is important, however, to safeguard any such plans so that only specially authorized child-placing agencies will be permitted to accept these relinquishments. This presupposes that no agency will be granted authorization for this unless it has staff members qualified to make the necessary inquiry about the wisdom of accepting the child and is likewise equipped to make a satisfactory placement of the child in an adoptive home.

5. *For the Child Who is Without a Living Parent and Also Without a Guardian Authorized to Consent in Place of the Parent, the Consent of a Public Department, Preferably the State Department of Welfare, Shall Be Required.*—Sound procedure demands that no adoption be granted without consent from an authorized source. But when the parents are dead and the guardian appointed for the child is really the guardian of his estate without authority to plan for his social welfare, the state

department of public welfare should preferably be responsible for giving consent. Presumably this department has already become acquainted with the child's situation through the social study made following receipt of the petition for adoption and therefore is in a favorable position to know what is best for the welfare of the child.

Eleven states have made provision for this, although in only five states consent by the state department of welfare is required; in four states consent by the state department of welfare is optional. In one state consent must be given by the state department of welfare or by an agency or institution approved by the department. In another state consent must be given by the state department of welfare or an agency appointed to act as next friend to the child.

News and Notes

The following dates have been set for examinations to be given to candidates by the American Board of Pediatrics:

Written examination, locally under a monitor, Feb. 4, 1944.

Oral examination, Philadelphia, Pa., March 25 and 26, 1944, San Francisco, Calif., May 6 and 7, 1944.

The following have been admitted to membership in the American Academy of Pediatrics, Region V:

Dr. Manual Caceres Vigil, Tegucigalpa, Honduras.

Dr. German Castillo, Managua, Nicaragua.

In the September issue an error was made in transcribing the name of Dr. Mario Olinto de Oliveira, Rio de Janeiro, Brazil.

At the present time there are thirteen scholars from the South and Central Americas studying in pediatric clinics under Academy scholarships. They are as follows:

Mauricio Martins da Silva, Brazil, at Yale University
Eduardo Cassorla Levy, Chile, at University of California
Arnulfo Valencia, Colombia, at Harvard
Oscar Trevino Narro, Mexico, at Iowa
Alfredo Novo Segura, Mexico, at Minnesota
Joaquin de la Torre, Mexico, at Pennsylvania
Jorge Vallarino D., Mexico, at Michigan
Manuel Maria Bribesca C., Mexico, at Chicago Children's Memorial
Eugenio Martinez Baez, Mexico, at University of Cincinnati
Guillermo Llosa Ricketts, Peru, at University of Illinois
Manuel Francisco Cornejo B., Peru, at Chicago Children's Memorial
Hernan Hedderich A., Venezuela, at University of Chicago
Alejandro Rodriguez Delfino, Venezuela, at Johns Hopkins

The Annual Meeting of Region II of the American Academy of Pediatrics will be held at Cincinnati, Hotel Gibson, on Tuesday, Nov. 16, 1943.

9 A.M.

1. Opening Address

The Challenge of Post-War Pediatrics

A. A. Weech, M.D., Professor of Pediatrics, University of Cincinnati

2. Maternal Nutritional Deficiency as a Cause of Congenital Malformations

Josef Warkany, M.D., Assistant Professor of Pediatrics, University of Cincinnati

3. **Effects of Salicylates on Electrolytes and Prothrombin of the Blood**

Samuel Rapoport, M.D., Associate Professor of Pediatrics, and Gail S. Englender, M.D., and George M. Guest, M.D., University of Cincinnati

4. **Experiences in the Treatment of Meningitis Due to Infection With Haemophilus Influenzae**

Gertrude E. Howe, M.D., University of Cincinnati

5. **The Immune Response of Children to the Injection of Flexner Dysentery Vaccine**

Merlin L. Cooper, M.D., Associate Professor of Pediatrics, and Helen M. Keller, M.S., University of Cincinnati

6. **Does One Attack of Bacillary Dysentery Confer a Demonstrable Degree of Immunity Against Subsequent Attacks?**

Estelle W. Brown, B.S., and A. A. Weech, M.D., University of Cincinnati

Luncheon, Hotel Gibson, 12:30 p.m.

Address by Franklin P. Gengenbach, President, Denver, Colo., and Clifford G. Grulee, Secretary, Evanston, Ill.

2 P.M.

1. **Development of Usefulness**

C. A. Aldrich, M.D., Professor of Pediatrics, Northwestern University, Chicago, Ill.

2. **Parenteral Administration of Vitamin D as a Routine Measure for the Prevention of Rickets**

Henry J. Gerstenberger, M.D., Professor of Pediatrics, Western Reserve University, Cleveland, Ohio

3. **Recent Experience With Children With the Celiac Syndrome**

Katherine Dodd, M.D., Associate Professor of Pediatrics, Vanderbilt University, Nashville, Tenn.

4. **Fundamentals in Poliomyelitis**

John A. Toomey, M.D., Professor of Clinical Pediatrics, Western Reserve University, Cleveland, Ohio

5. **The Use of Evaporated Milk Without Added Sugar for the Artificial Feeding of Infants**

Hugh McCulloch, M.D., Associate Professor of Pediatrics, Washington University, St. Louis, Mo.

Meeting of Membership of Region Two—4:30 p.m.
Banquet, Gibson Hotel
Roof Garden Ball Room, 8:00 p.m.
Dr. J. V. Greenebaum, Presiding

The Annual Meeting of the New Jersey Fellows of the American Academy of Pediatrics was held at the Hotel New Yorker, New York City, on Friday, Oct. 22, 1943, on the general subject of Wartime Child Health Problems.

The program was as follows:

Morning Session—9:00 a.m.

Dr. L. Charles Rosenberg, Newark, N. J., Presiding

(N. J. State Committee A. A. P.)

1. Welcome

Dr. Harrold A. Murray, Newark, N. J., State Chairman of New Jersey Fellows of the A. A. P.

2. 9 o'clock

Wartime Problems in Child Health Conferences

Dr. Katherine Bain, Washington, D. C., U. S. Children's Bureau, Department of Labor; Dr. Julius Levy, Newark, N. J., Chief of the N. J. State Bureau of Maternal and Child Health

3. 9:30 o'clock

Wartime Problems in School Health

Dr. Harold Mitchell, Astoria, L. I., Chairman of the School Health Committee, A. A. P.; Dr. Wilson Guthrie, Newark, N. J., Director of Health and Physical Education, N. J. State Department

4. 10 o'clock

Child Care Centers

Dr. Ellen Potter, Trenton, N. J., Chairman of the Child Care Committee of the N. J. Community War Services; Dr. Martha Eliot, Washington, D. C., Associate Chief, U. S. Children's Bureau, Department of Labor; Miss Mary Mooney, Newark, N. J., Director of Family Division, Associated Catholic Charities of New Jersey

5. 10:30 o'clock

Pediatric Education and Research in Wartime

Dr. Clifford Grulee, Evanston, Ill., Treasurer of the A. A. P.; Dr. Jeffery Rake, New Brunswick, N. J., Director of Micro-biological Research Department, E. R. Squibb & Sons, New Brunswick, N. J.

Afternoon Session—2:00 p.m.

Dr. Harold F. Tidwell, West New York, N. J., Presiding

(N. J. State Committee A. A. P.)

6. 2 o'clock

Panel Discussion: The Maintenance of Essential Pediatric Care of Children in Wartime

Chairman: Dr. O. Stringfield, Stamford, Conn., State Chairman, Connecticut Fellows of A. A. P.

In Cities: Dr. Chester Brown, Arlington N. J., N. J. State Committee, A. A. P.

In Towns: Dr. F. Lathrop, Plainfield, N. J., N. J. State Committee, A. A. P.

Rural: Dr. William Herrmann, Asbury Park, N. J., Monmouth County Medical Chief of Civilian Defense

In Industrial Areas: Dr. Joseph Linde, New Haven, Conn., Member of State Department of Health.

7. 3 o'clock

Nutrition in Babies and Children

Dr. Sarah Dietrick, Washington, D. C., U. S. Children's Bureau, Department of Labor; Dr. C. Hendee Smith, New Brunswick, N. J., Former Professor of Pedi-

atrics, New York University; Dr. Joseph Wall, Washington, D. C., Professor of Pediatrics, Georgetown University, Member Nutrition Committee, A. A. P.

8. **3:30 o'clock**

Building Child Health in Our American Democracy

Dr. Stanley Nichols, Asbury Park, N. J., Chairman Region I, A. A. P.

9. **3:40 to 5:00 P.M.**

Adolescents in Wartime

Chairman: Dr. J. Plant, Newark, N. J., Director of Juvenile Clinic, Essex County, N. J.

Physical Health: Dr. H. Bakwin, New York, Assistant Professor of Pediatrics, New York University

Spiritual Health: Rev. E. Thomas, Haddonfield, N. J., Pastor of First Methodist Church, Haddonfield, N. J.

Delinquency: Hon. K. Kalteissen, New Brunswick, N. J., Judge of Juvenile and Domestic Relations Court, Middlesex County, N. J.

Evening Session

10. **9:00 o'clock to 10:30 o'clock**

Recent Advances in Pediatrics

Chairman: Dr. A. DeSanctis, New York,

Rh Blood Factor: Dr. P. Levine, Newark, N. J.; Dr. L. Unger, New York, N. Y.

Celiac Disease: Dr. Dorothy Andersen, New York, N. Y.

Encephalography: Dr. C. Peterson, New York, N. Y.; Dr. B. Pacella, New York, N. Y.

Chemotherapy: Dr. B. Carey, Pearl River, N. Y.

CURRENT PEDIATRIC LITERATURE

1942-1943

HUGH McCULLOCH, M.D.
St. Louis, Mo.

THE JOURNAL OF PEDIATRICS
NOVEMBER, 1943

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CURRENT PEDIATRIC LITERATURE

1943

Being a List of Books, Journals,
Reports, and Other Memoranda,
Chosen as Useful Material for
Essential Acquisition and Collateral Reading,
Selected From Publications During
1942 and 1943,
Prepared for Physicians and Others
Interested in the Field of Pediatrics

EDITED AND ANNOTATED
by
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APPROVED BY
THE AMERICAN ACADEMY OF PEDIATRICS
and
The Editorial Staff of The Journal of Pediatrics

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PREFACE

The List of Books and Journals for 1942-1943* has been prepared again according to the same general plan used in selecting and arranging the List for the two previous years of publication. It semed wise to make changes in the arrangement, but the List still follows the original idea and purpose of bringing to the pediatric profession a reliable, comprehensive, and accessible means of reaching the new literature in an easy way, and to point out to all where the need lies for expanding or developing new endeavors in the field of publication. It is intended that the List each year shall be complete for the period indicated, but it is also important that reference be made to the Lists of previous years. Otherwise, one might miss a book which in his opinion is better suited or more useful than the current one since a book on any one List is not necessarily the best one available.

The present war conditions have entered definitely in the book and publishing business. Work by authors is undoubtedly curtailed in many ways. The quality of material used in manufacture has been greatly altered by various necessities, and there have developed definite trends in selection of books. The number of outlines, synopses, and manuals has greatly increased and these must be meeting with success both in military circles and probably in the student group working under such streamlined, hurried conditions from pressure of time. None of the books of this type have been included in the List. The source of foreign books and journals has necessarily been depleted so that none are obtainable, and no source of information is available as to which ones exist.

The changes which have been introduced in this year's List are minor. A few subtitles have been omitted through consolidation or because no book has appeared in that particular field. Some subtitles have been retained with a very scant listing, maybe in certain instances only to keep the subject alive and present. In a great many instances the derivation of the subtitle has been given, especially if this comes from the Greek or Latin, and also definition of the subtitle has been given in order to clarify the meaning used in selecting the books as well as to direct some thought to what we, as pediatricians, mean by such terms as *Growth*, *Genetics*, etc. This may be provocative of discussion as well as thought. The section on *Parent Education* has been left out. A few books from that section have been placed in another appropriate one, and in this way a highly controversial subject has been avoided. The number of books appearing in this general field, if one includes also those for, and by, teachers, social workers, psychologists, is increasing very rapidly, about

*See Current Pediatric Literature, 1941-1942, J. PEDIAT. 21 (Part II), November, 1942.

in proportion to the increase in the number of constituents in this field. At times it seems as though each one is trying to write a book. It is doubtful if a pediatrician can really use many of these books to advantage, and it would be a well-nigh impossible task to select the best for inclusion in the List of Books and Journals. Books written by pediatricians for parents and interested workers come within this same general class. References to book reviews have been expanded to include any of the medical journals regularly presenting reviews. These references should enable one to form an opinion about a given book on the List. When new editions have appeared, the annotation emphasizes the changes which show in the new edition; also, reference has been made to a previous edition of *Current Pediatric Literature* when the previous edition was described. The symbol (C) or (E) following the annotation indicates whether the book or journal may be classified for *collateral* reference or for *essential* reading and acquisition. A number of new books intended primarily for medical students, usually in the basic sciences, has been included because these books are useful to a busy doctor interested in a special subject or eager to refresh his knowledge by a short, rapid review without having to consult the full literature or more extensive monographs on the subject.

Current Pediatric Literature is presented again with a hope it may prove useful. Grateful acknowledgment is made to the many publishers who have cooperated by submitting books for consideration and, in many instances, for their suggestions of new books which had not come to my attention. The books have not been on exhibit this year since the American Academy of Pediatrics has held no annual meeting. Continued suggestions from readers will be appreciated.

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LIST OF BOOKS AND JOURNALS

1942-1943

1. Adoption (L. adoptare, fr. ad, to + optare, to choose.)

An Adopted Child Looks at Adoption, *Prentice, Carol S.* D. Appleton-Century Co., Inc., New York, 1940, 222 pages.

Written by one who was an adopted child and who has adopted a daughter to round out her own family of two sons. Offers the viewpoint of both the adopted child and the adopting parent. Discusses also the legal and sociologic aspects of the subject. (C)

CONTENTS: Adopted yet apart. Decisions and regrets. Always mother's child. Case for a father. Spinsters as parents. Building babies for adoption. Questions of records. My conflicts and aspirations. I adopt a child. Unmarried mother. Babies for sale. Safeguarding the mother. Safeguarding the child. Fairy-tale approach. Fits and misfits. Human material. Heredity and environment. Right home for the right child. Motives for adoption. It takes courage. Challenge of the underprivileged. Manual for adopting parents.

2. Allergy (Gr. állos, other + érgon, $\frac{\text{energy}}{\text{work}}$.) An altered or unusual specific sensitivity to a foreign substance which is neutral to other members of the same species.

Allergy, Anaphylaxis and Immunotherapy, *Ratner, Bret, M.D.* Williams & Wilkins Co., Baltimore, 1943, 834 pages.

Discusses serum allergy in the human subject. Through this approach, the genesis and fundamentals of allergy are considered. Does not include topical and contact sensitivities. J. A. M. A. **123:** 121, 1943. (C)

CONTENTS: Principles and practice of immunotherapy. Allergy to immunotherapeutic agents. The allergic state.

Allergy, *Urbach, Erich, M.D.,* and *Gottlieb, Philip M., M.D.* Grune & Stratton, Inc., New York, 1943, 1,073 pages.

A critical presentation, along with representative illustrations, to serve as a guide in the diagnosis and management of diseases of hypersensitiveness. Discussion of fundamental principles in the initial chapters of Part I, the rest of which is devoted to the methods of diagnosis and treatment. Part II deals extensively with the more common etiologic agents, while Part III comprises a discussion of various diseases from the clinical and therapeutic viewpoints. Written from the viewpoint of the dermatologist so that the balance is off slightly in that direction. Am. J. M. Sc. **206:** 417, 1943; Arch. Int. Med. **72:** 427, 1943. (C)

Familial Nonreaginic Food-Allergy, *Coca, Arthur F., M.D.* Charles C Thomas, Springfield, Ill., 1943, 160 pages.

It is suggested that another category of familial allergic disease should be recognized in addition to atopy, hypersensitivity of infection, serum disease, and contact

dermatitis; namely, familial nonreaginic food allergy. Considerable discussion is given to the acceleration of the pulse caused by the allergic reaction on which the whole system of testing rests. Children offer an important group for consideration of this type of allergy. Am. J. M. Sc. **205**: 600, 1943; Arch. Int. Med. **71**: 582, 1943. (C)

The Journal of Allergy, *Alexander, Harry L., M.D., Editor.* The C. V. Mosby Co., St. Louis.

For the Society for the Study of Asthma and Allied Conditions and the American Association for the Study of Allergy. Original articles, reports, proceedings, abstracts. Current volume, 15. Bimonthly. (C)

3. Anatomy (Gr. aná, apart + temnein, to cut.)

Gray's Anatomy of the Human Body, *Lewis, Warren H., M.D., Editor.* Lea & Febiger, Philadelphia, ed. 24, 1942, 1,428 pages.

J. A. M. A. **120**: 1076, 1942; Am. J. M. Sc. **204**: 753, 1942. (C)

Morris' Human Anatomy, *Schaeffer, J. Parson, M.D., Editor.* The Blakiston Co., Philadelphia, ed. 10, 1942, 1,635 pages.

J. A. M. A. **120**: 869, 1942; Am. J. M. Sc. **205**: 429, 1943; Bull. Johns Hopkins Hosp. **71**: 309, 1942. (C)

Anatomical Record (Journal), *Boyden, Edward A., Ph.D., Managing Editor.* Wistar Institute of Anatomy and Biology, Philadelphia.

For the American Association of Anatomists and the American Society of Zoologists. For prompt publication of articles on vertebrate anatomy, preliminary reports, technical and critical notes of interest to anatomists, and short reviews of noteworthy publications. Original articles, book reviews, proceedings. Current volume, 86. Monthly. (C)

American Journal of Anatomy, *Smith, Philip E., Ph.D., Managing Editor.* Wistar Institute of Anatomy and Biology, Philadelphia.

Devoted primarily to the interests of anatomy as taught in medical schools of the United States and the development of scientific anatomy in these schools. Original articles only. Current volume, 73. Bimonthly. (C)

4. Anesthesiology (Gr. an, not + áisthesis, sensation + logos, sum of scientific knowledge of.)

Clinical Anesthesia, *Lundy, John S., M.D.* W. B. Saunders Co., Philadelphia, 1942, 771 pages.

Describes the methods of anesthesia. Chapters of medical and pediatric interest are on instructions to physicians, dentists, nurses and assistants, equipment, and drugs used; a preliminary consideration of general anesthesia; care and medication

preliminary to operation; subsequent care and medication; venipuncture; intravenous therapy; and resuscitation. J. A. M. A. **120**: 994, 1942; Am. J. M. Sc. **205**: 430, 1943; Bull. Johns Hopkins Hosp. **72**: 125, 1943. (C)

Fundamentals of Anesthesia. American Medical Association Press, Chicago, 1942, 215 pages.

Prepared by the Subcommittee on Anesthesia for the National Research Council. Intended primarily to serve as a basis for the instruction of medical officers as anesthetists but should be useful as well to many others, including pediatricians, since its emphasis is on the principles governing safety in the administration of depressant drugs and the care of patients in a state of respiratory or circulatory depression. Am. J. M. Sc. **204**: 752, 1942. (C)

CONTENTS: Records. Physiologic and pharmacologic considerations. Relief of pain. Local anesthesia. Special technics. Complications. Special considerations.

5. Athletics (Gr. áthlon, prize.) The games and sports of those trained or fit to contend in exercises requiring physical ability, stamina, or strength.

Athletic Injuries, *Thorndike, Augustus, M.D.* Lea & Febiger, Philadelphia, ed. 2, 1942, 216 pages.

Presents the problems of prevention, diagnosis, and treatment of injuries received in sports and games. The description of the implications involved in physical training and physical fitness should be understood by all those who deal with organized squads in training. There should be an answer to the many questions raised in pediatric practice as to whether certain children are suitable for high school and college athletics. J. PEDIAT. **22**: 134, 1943; J. A. M. A. **119**: 984, 1942; Canad. M. A. J. **47**: 500, 1942. (C)

CONTENTS: Prevention of injuries in athletics. Physical fitness, training, and fatigue. Further aids in prevention of injury. The more common types of athletic injuries. The more common regional injuries. Their diagnosis and treatment. Physical therapy.

6. Bacteriology (Gr. báktron, a staff + logos, q.v.)

Textbook of Bacteriology, *Jordan,* Edwin O., and Burrows, William, Ph.D.* W. B. Saunders Co., Philadelphia, ed. 13, 1942, 731 pages.

Extensive revision by the junior author after only three years following the death of Professor Jordan, necessitated by work in this rapidly changing field. A clinical reference work that will act also as a guide for student and research worker. Covers the field of bacteriology in its widest sense. (C)

Bacteriology for Students of Medicine and Public Health, *Leifson, Einar, M.D.* Paul B. Hoeber, Inc., New York, 1942, 526 pages.

One of a series of four texts on preclinical subjects (see also Chemistry, Embryology), designed for the undergraduate medical student, presenting the basis of the subject in such form and degree of detail as he can absorb in the time allotted.

*Deceased.

For the graduate clinician the books should save time and trouble of digging material out of an encyclopedic tome to refresh his knowledge of the basic sciences. To keep within the bounds which are commensurate with the time and effort the medical student can devote to the subject necessitates the elimination of much material which is usually included in more general bacteriology texts. (E)

CONTENTS: General biology. General aspects of bacterial infection and host resistance. Systematic study and classification of bacteria. Bacteriology in relation to agriculture and industry. Biostatistics and epidemiology. Diseases of major medical importance. Fungi and protozoa. Laboratory technic.

Bacteriological Reviews (Journal), *Cohen, Barnett, Ph.D., Editor.* Williams & Wilkins Co., Baltimore.

For the Society of American Bacteriologists. Current volume, 7. Quarterly. (C)

7. Bibliography (Gr. bíblos, book + gráphéin, to describe.) Description of books and manuscripts with notices of editions, dates of printing, etc. A list of writings relating to a given subject.

1942 Year Book of Pediatrics, *Abt, Isaac A., M.D., and Abt, Arthur F., M.D.* The Year Book Publishers, Inc., Chicago, 1943, 500 pages.

Progress in pediatrics is analyzed and carried forward, year by year, in this clinical review. Brit. M. J. 1: 789, 1943. (C)

CONTENTS: Newborn. Feedings of infants. Nutrition and nutritional disturbances—vitamins. Gastrointestinal diseases and diseases of the liver. Infectious diseases. Parasites. Rheumatism. Heart. Diseases of the blood. Tuberculosis. Syphilis. Respiratory diseases. Glands of internal secretion. Nervous and mental diseases. Genitourinary diseases. Skin. Allergy. Scurvy. Rickets. Public health. Therapeutics and toxicology. Diseases of bones and muscles. Surgery and anesthesia. Eye, ear, nose and throat. Mouth and teeth. Children's hospitals.

A Handbook of Medical Library Practice, *Doe, Janet, Editor.* American Library Association, Chicago, 1943, 609 pages.

For the Medical Library Association. A manual of procedure and a reservoir of useful data, including annotated bibliographic guides to the literature and history of the medical and allied sciences. (C)

CONTENTS: The medical library, development, distribution, administration. Periodical and book selection and ordering. Cataloging. Subject headings. Classification. Pamphlets and pictures, maps and microfilms. Rare books and the history of medicine. Reference works, including an annotated list of reference works.

American Journal of Diseases of Children, Abstract Section, American Medical Association Press, Chicago. (E)

Quarterly Cumulative Index Medicus (Journal), *Fishbein, Morris, M.D., Editor.* American Medical Association Press, Chicago. Current volume, 34. Quarterly. (C)

Bulletin of the Medical Library Association (Journal), *Jones, Harold W., M.D., Editor.* Cleveland.

Original articles, bibliography, book reviews, notices. Current volume, 31. Quarterly. (C)

8. Biology (Gr. bíos, life + logos, q.v.)

Aerobiology, *Moulton, Forest Ray, Ph.D., Editor.* Publication No. 17, American Association for the Advancement of Science, Washington, D. C., 1942, 289 pages.

A symposium of thirty-seven papers presented in Chicago in 1942. Includes both extramural and intramural aerobiology. Discussion includes both the theoretic and practical aspects. Brit. M. J. 2: 755, 1942. (C)

Biological Abstracts (Journal), *Flynn, John E., Ph.D., Editor in Chief.* University of Pennsylvania Press, Philadelphia.

For the Union of American Biological Societies. Abstracting in theoretic and applied biology, exclusive of clinical medicine. Current volume, 17. Ten issues annually. Published also in six sections: (a) general biology; (b) experimental animal biology; (c) microbiology, immunology, and parasitology; (d) plant science; (e) animal science; and (f) animal production and veterinary science. (C)

Quarterly Review of Biology (Journal), *Willier, B. H., Ph.D., Editor.* Williams & Wilkins Co., Baltimore.

Original articles, book reviews. Current volume, 18. Quarterly. (C)

Human Biology (Journal), *Reed, Lowell J., Ph.D., Editor.* Johns Hopkins Press, Baltimore.

Publishes results of original research in all fields of human biology, including physical and general anthropology, anthropometry, vital statistics, human heredity and eugenics, prehistory, human anatomy, sociology, constitutional pathology and psychobiology. Original articles, notes, literature. Current volume, 15. Quarterly. (C)

9. Biometry (Gr. bíos, life + metron, measure.) Calculation of the probable duration of human life. Statistics applied to biologic observations.

Public Health Statistics, *Hall, Marguerite F., Ph.D.* Paul B. Hoeber, Inc., New York, 1942, 408 pages.

Intended for use as a text for a basic course in public health statistics and as reference material in health departments. It lays the groundwork for an understanding of the collection, organization, and interpretation of data pertinent to public health and vital statistics. A great deal of stress has been given to the interpretation of statistic data; to a reasoning application of technics; and above all to a wholesome, constructive, critical attitude of statistic materials, a wealth of which flows through the hands of public health workers. Stress has been placed on the applicability of the fundamentals of statistics to all fields, although most of the illustrative problems and examples have been chosen for public health personnel. J. A. M. A. 121: 90, 1943. (C)

CONTENTS: Introduction and orientation. General principles of computation and handling of mass data. Tabular presentation. Graphic presentation. Population data. Estimates of populations. Standard millions. Vital events. Rates. Mortality rates. Vital statistics other than mortality. Variation and trends in rates. Ratios and index numbers. Construction of a life table. Mass data; preliminary definitions. Measures of central tendency. Measures of variability. Measures of relationship and trend. Theory of probability; point binomial; normal curve. Measures of reliability. Prerequisites to the application of statistic methods.

Elements of Statistics, *Mode, Elmer B.* Prentice-Hall, Inc., New York, 1942, 378 pages.

Favors no particular field of interest. The author states there is a peculiar logic associated with the study of statistics. Some call it common sense, and it is difficult to dissociate the purely mathematical aspects from those requiring a good brand of clear thinking. Sound mathematical conclusions should be accompanied by a healthy appreciation of what such conclusions do *not* assert. An intelligent appraisal of limits of accuracy, accompanied by the elimination of useless calculations, is a legitimate and an important aim in the teaching of statistics. Am. Rev. Tubere. **47:** 225, 1943. (C)

CONTENTS: Computation. Charts, diagrams, and graphs. Frequency distributions. Arithmetic, harmonic and geometric means. Median and other positional averages. Index numbers. Measures of dispersion. Uniform scales. Moments. Frequency curve. Curve fitting. Correlation. Binomial distribution. Measures of reliability; chi square test.

Birth Certificates, *Davis, Earl H.* H. W. Wilson Co., New York, 1942, 136 pages.

A digest of the laws and regulations of the States. Information on procedures in each state for obtaining a delayed certificate of birth. Also a description of the records with instructions and fees. A full chapter on general instructions or procedures, especially for a delayed certificate. The book should be useful for information as to where and how to secure a birth certificate. (C)

Manual of the International List of Causes of Death and the Manual of Joint Causes of Death, *Janssen, Theodore A., under the supervision of Dunn, Halbert L., M.D.* Department of Commerce, Bureau of Census, ed. 5, 1940, 440 pages, Division of Public Documents, U. S. Government Printing Office, Washington, D. C.

Adopted for use in the United States, based on the fifth decennial revision by the International Commission. The character of the tabular list has been changed by the designation of approved or acceptable cause-of-death terminology. The Index of Causes of Death has been somewhat changed by the exclusion of terms which are no longer reported or are reported infrequently. The Manual of Joint Causes of Death has been incorporated because it is an integral part of this classification system. It shows the relation between International List titles for selection of the preferred cause of death when two or more causes are reported. (C)

10. Blood Grouping and Transfusions

Blood Groups and Transfusions, *Wiener, Alexander S., M.D.* Charles C Thomas, Springfield, Ill., ed. 3, 1943, 438 pages.

Summarizes the present knowledge concerning the theory and technic of blood grouping; presents the applications in clinical, legal and veterinary medicine, and in anthropology; and assembles and integrates the essential facts concerning the transfusion of whole blood, plasma, and serum.

Contains two new chapters, one dealing with the transfusion of stored blood and blood substitutes, and the other with the recently discovered Rh factor and its role in erythroblastosis fetalis. Many new data have been added to the sections dealing with the racial distribution of the blood groups and the blood group factors in apes and monkeys, and older observations have been re-interpreted in the light of more recently acquired knowledge. J. A. M. A. **122:** 906, 1943; Arch. Int. Med. **71:** 906, 1943. (C)

Blood Grouping and Technic, *Schiff,* Fritz, and Boyd, William C., Ph.D.* Interscience Publishers, Inc., New York, 1942, 248 pages.

Gives clear and concise directions for carrying out blood grouping tests, not only as a preliminary to transfusions, but also in connection with cases of disputed parentage and other forensic applications and in anthropologic studies. A translation of the senior author's well-known book in German with numerous modifications and contributions by the American author. Am. J. Dis. Child. **64:** 962, 1942; Am. J. M. Sc. **204:** 892, 1942; Arch. Int. Med. **70:** 1098, 1942; Bull. Johns Hopkins Hosp. **73:** 140, 1943. (C)

Blood Substitutes and Blood Transfusion, *Mudd, Stuart, M.D., and Thalhimer, William, M.D., Editors.* Charles C Thomas, Springfield, Ill., 1942, 407 pages.

An analysis of the mechanisms of secondary shock leading to the useful generalization that the basic physiologic defect is reduced circulating fluid volume. Human serum and plasma are the obvious restoratives of circulating fluid volume, and the numberless questions relating to procurement, preservation, administration, and efficacy of these blood substitutes are presented and discussed in detail. Experiments with newer blood substitutes, human hemoglobin, and human and bovine serum albumin are described; one or more of these may, with further experience, assume great practical importance. The problems involved in procuring blood substitutes for the armed forces of this country and Canada and as an aid to the armed and civil population of Britain are presented. Relevant aspects of the storage, transportation, and administration of whole blood are included, as well as something of therapeutic experience with blood and blood substitutes. Am. J. M. Sc. **205:** 428, 1943; Canad. M. A. J. **48:** 378, 1943; Brit. M. J. **1:** 221, 1943. (C)

CONTENTS: Etiology and mechanisms of secondary shock. Methods of preservation of plasma and serum by desiccation and by freezing. Hemoglobin, serum albumin, and casein digest as blood substitutes. Blood substitutes in the world emergency. Whole blood: storage, transportation, administration, isoagglutinins, and blood group specific substances. Therapeutic experiences with serum and plasma.

The Blood Bank and the Technique and Therapeutics of Transfusions, *Kilduffe,* Robert A., and DeBakey, Michael, M.D.* The C. V. Mosby Co., St. Louis, 1942, 558 pages.

Embraces the important phases of blood transfusion. These phases are undergoing current intensive investigations and, therefore, are in a state of rapid flux with new developments and modifications of technics continually occurring. Reviews comprehensively the subjects of "blood banks" and plasma transfusion, and the preparation and preservation of fresh and processed plasma. J. PEDIAT. **20:** 279, 1942; Am. J. Dis. Child. **63:** 1010, 1942; Bull. Johns Hopkins Hosp. **73:** 140, 1943. (C)

CONTENTS: History. Rationale, indications, and contraindications. Military aspects of transfusion. Special types of transfusion. Technic of blood typing and compatibility tests. Anomalous blood typing reactions: their nature, causes, and detection, and methods for their elimination. The "universal donor" and the "universal recipient." The blood bank. Changes which occur in stored blood. Biochemical changes in stored blood. Operation of a blood bank. Plasma transfusion. Preparation and preservation of citrated plasma. Preparation of concentrated and dried plasma. Methods of technic of transfusion. Complications of blood transfusion.

11. Cardiology (Gr. kardia, heart + logos, q.v.) Treats of the structures (anatomy), functions (physiology) and diseases (pathology) of the heart.

*Deceased.

Principles and Practice of Cardiology, *Bramwell, Crighton, M.D., and King, John T., M.D.* Oxford University Press, New York, 1942, 509 pages.

Examination of the heart is approached only partially through methods of scientific precision, and the value of a textbook depends a great deal upon the experience and personality of the author. In the United States and Canada, laboratory methods and investigation have come to occupy a much more prominent position than in Britain, where clinical observation has always dominated the picture. These two viewpoints are not opposed but complementary.

The subject is divided into general and special cardiology. The first deals with the general problems such as disturbances of cardiac function, clinical methods, and the treatment and prognosis, while the second is devoted to the different etiologic types of heart disease. J. A. M. A. **120:** 1442, 1942; Bull. Johns Hopkins Hosp. **71:** 307, 1942; Canad. M. A. J. **47:** 498, 1942. (C)

Clinical Roentgenology of the Cardiovascular System, *Roesler, Hugo, M.D.* Charles C Thomas, Springfield, Ill., ed. 2, 1943, 480 pages.

As late as 1920 Sir Thomas MacKenzie wrote: "Indeed I doubt if an x-ray examination of the heart has ever thrown the slightest light on any cardiac condition." But to disregard this method means to renounce much of what our best-trained sense, the eye, can perceive. Also the application of one method sets very definite limitations to the desire to know and to understand the "whole." The new edition represents the steady progress in this field. Arch. Int. Med. **71:** 906, 1943; Am. Heart J. **26:** 433, 1943. (C)

American Heart Journal, *Smith, Fred M., M.D., Editor.* The C. V. Mosby Co., St. Louis.

For the American Heart Association. Original articles, abstracts, book reviews. Current volume, 26. Monthly. (C)

12. Chemistry (Gr. chemeia, chemistry.)

Chemistry and Methods of Enzymes, *Sumner, James B., Ph.D., and Somers, G. Fred.* Academic Press, Inc., New York, 1943, 365 pages.

A general survey of enzyme chemistry. Discusses the history, recurrence, action, specificity, activity measurement, activation and inactivation, preparation, and properties of most of the important enzymes. J. A. M. A. **123:** 177, 1943. (C)

Biochemistry of Disease, *Bodansky,* Meyer, and Bodansky, Oscar, M.D.* The Macmillan Co., New York, 1940, 684 pages.

Systematic presentation of biochemical aspects of various diseases, arranged according to clinical entities. Since it is through this relation to particular clinical situations that the physician usually experiences his interest in biochemistry, the arrangement of the biochemical material in accordance with clinical entities is pertinent. General presentations and descriptions of laboratory methods are not included. (E)

*Deceased.

Medical Biochemistry, *Everett, Mark K., Ph.D.* Paul B. Hoeber, Inc., New York, 1942, 694 pages.

One of a series of four texts on preclinical subjects. Each chapter is divided into separate sections which deal with chemistry, metabolism, and pathology, respectively, an arrangement which is suited to various types of instruction. The chemical and metabolic sections are carefully organized for study by the beginner and for rapid review by the advanced student; the pathology sections contain systematic discussions of the biochemical aspects of diagnosis and therapy.

The subject matter includes certain topics not found in contemporary texts as, for example, discussions of logarithms, the vehicular functions of plasma proteins, permeability of capillaries and placenta, biliary and renal calculi, colloid chemistry in histology, bacterial activities in the intestine, principles of diet therapy, the lipidoses, metabolism of acids related to carbohydrates, the chemistry of immunity and heredity, metabolism of bone, the phosphatases, and the metabolic interrelations of minerals. The summarizing chapters on vitamins and hormones, which are based largely upon recent researches, and the sections on phospholipide, steride, protein and mineral metabolism, have been presented in particularly systematic fashion. J. A. M. A. **122**: 1276, 1943. (E)

CONTENTS: Acid-base relations. Colloids, enzymes and oxidation. Digestion. Lipides. Carbohydrates. Proteins. Prosthetic radicals of nucleoproteins and chromoproteins. Inorganic substances. Vitamins and avitaminoses. Hormones and endocrinoses.

Introduction to Organic and Biological Chemistry, *Arnow, L. Earle, M.D., and Reitz, Henry C.* The C. V. Mosby Co., St. Louis, 1943, 736 pages.

A somewhat unusual book which may be of interest to some physicians because of its unique way of presenting the relationship of organic and biologic chemistry to natural sources and industry in its larger aspects. It is elementary chemistry reduced to a simple form, but the range of interest is far and wide and useful. Bull. Johns Hopkins Hosp. **73**: 64, 1943. (C)

Vitamins and Hormones, *Harris, Robert S., and Thimann, Kenneth V., Editors.* Academic Press, Inc., New York, Vol. I, 1943, 452 pages.

Accumulates, correlates, and digests the current literature in the form of review articles in the field of vitamins and hormones written by selected authors. Intended primarily as a reference book to be published in yearly volumes. Ten subjects are included. Am. J. M. Sc. **206**: 416, 1943. (C)

Chemical Reviews (Journal), *Noyes, W. Albert, Jr., Editor.* Williams & Wilkins Co., Baltimore.

For the American Chemical Society. Critical reviews and summaries in theoretic chemistry. Current volume, 33. Bimonthly. (C)

Journal of Biological Chemistry, *Editorial Board.* Williams & Wilkins Co., Baltimore.

For the American Society of Biological Chemists. For the prompt publication of investigation of a chemical nature in the biologic sciences. Original articles only. Current volume, 149. Monthly. (C)

Journal of Physical Chemistry, *Lind, S. C., Ph.D., Editor.* Williams & Wilkins Co., Baltimore.

For the American Chemical Society and the Faraday Society. Original articles, book reviews. Current volume, 47. Nine issues annually. (C)

Journal of Organic Chemistry, *Small, Lyndon F., Ph.D., Editor.* Williams & Wilkins Co., Baltimore.

Original articles only. Current volume, 8. Bimonthly. (C)

Archives of Biochemistry (Journal), *Editorial Board.* Academic Press, Inc., New York.

Covers the field of chemical structures and reactions of living organisms. Original articles, book reviews. Current volume, 2. Bimonthly. (C)

13. Communicable Disease (L. communicare, to convey.)

Communicable Disease Control, *Anderson, Gaylord W., M.D., and Arnstein, Margaret, R.N.* The Macmillan Co., New York, 1941, 434 pages.

Written principally from the standpoint of the community. While personal protection has not been neglected, emphasis has been placed on those procedures which are designed to protect the population as a group rather than merely the individual. Evaluates the various control measures as to their relative effectiveness and outlines programs that will yield the greatest return in terms of necessary expenditure. Discussion limited to control measures that are applicable under the conditions which confront the health department. Am. J. Dis. Child. **63:** 632, 1942; J. A. M. A. **118:** 677, 1942. (E)

CONTENTS: Historic considerations. Infectious process. Control measures. Legal basis of communicable disease control. Administrative agencies. Role of public health nurse. Care of communicable disease case at home. Epidemiologic investigation of communicable diseases. Discussion of prevention and treatment of particular diseases falling within the scope of the book.

Neural Mechanisms in Poliomyelitis, *Howe, Howard A., M.D., and Bodian, David, M.D.* Commonwealth Fund, New York, 1942, 234 pages.

Presents a series of experimental studies of poliomyelitis in animals, concerned chiefly with the role played by nerve fibers and nerve cells in the penetration into, and migration of the virus within, the body, as well as with certain questions of resistance and immunity. The results of these experiments are applied to the problems of human poliomyelitis. Presents data which point to the alimentary tract as a portal of entry for the virus and brings forth some new evidence relating to alterations in resistance and the acquisition of immunity. J. A. M. A. **119:** 984, 1942; Am. J. M. Sc. **204:** 890, 1942; Bull. Johns Hopkins Hosp. **71:** 247, 1942. (C)

CONTENTS: Neurotropism of poliomyelitis virus: mechanism and rate of virus spread in peripheral nerve: genesis of cerebral lesions. Role of neurons in dissemination of virus in central nervous system. Behavior of virus in peripheral nerves and in non-nervous tissues. Portal of entry problem in man: the experimental animal. Pathology of early arrested and nonparalytic poliomyelitis. Virus-refractory states in nerve cells. Problems of immunity in poliomyelitis presented by second attacks. Summing up.

The Kenny Concept of Infantile Paralysis and Its Treatment, *Pohl, John F., M.D.* The Bruce Publishing Co., Minneapolis, 1943, 366 pages.

A full discussion of the principles and technics being advocated by Sister Kenny, including a lengthy statement by herself. These are based on her concept that in-

fantile paralysis is a disease in which disturbance of physiologic function of the nervous system is of more importance than actual architectural change, and that "muscle spasm," "mental alienation," and "incoordination" are the primary lesions in the muscle rather than paralysis. The treatment designed on these concepts has nothing in common with the usually accepted and advocated methods. J. A. M. A. **122**: 1050, 1943. (C)

The Kenny Treatment of Infantile Paralysis, *Cole, Wallace H., M.D., Pohl, John F., M.D., and Knapp, Miland E., M.D.* National Foundation for Infantile Paralysis, Inc., New York, Publication No. 40, 1942, 47 pages.

Respirators: Locations and Owners. National Foundation for Infantile Paralysis, Inc., New York, Publication No. 24B, 1942, 23 pages.

Encephalitis, *Neal, Josephine B., M.D.* Grune & Stratton, Inc., New York, 1942, 563 pages.

This further report for the Matheson Commission for the Study of Epidemic Encephalitis brings the knowledge of this disease up to date. All phases of the subject are fully covered, especially the experimental and laboratory side, so that the book will appeal to a wide circle. Chapters on special subjects have been contributed by several workers and add to the value and completeness of the report. (C)

CONTENTS: General discussion. Epidemiology. Neurologic complications following acute infections and vaccination. Clinical course. Treatment. Surgical treatment of postencephalitic symptoms. Psychiatric sequelae. Postencephalitic behavior disorders in childhood. Pathology.

Virus Diseases. Cornell University Press, Ithaca, N. Y., 1943, 170 pages.

Six Messenger Lectures on the Evolution of Civilization, delivered at Cornell University in 1942 by members of the Rockefeller Institute for Medical Research. Am. J. M. Sc. **205**: 595, 1943; Canad. M. A. J. **49**: 158, 1943. (C)

Rabies, *Webster,* Leslie T.* The Macmillan Co., New York, 1942, 168 pages.

An authoritative, critical, but simple treatise on how rabies is diagnosed and how it can be controlled. Written for the dog owner and general public as well as for the veterinarian, physician, and student of virus diseases. Am. J. Dis. Child. **64**: 202, 1942; Bull. Johns Hopkins Hosp. **71**: 250, 1942. (C)

Air-Borne Infection, *O'Hara, Dwight, M.D.* Commonwealth Fund, New York, 1943, 114 pages.

An interesting group of essays on several communicable diseases with a central theme of the factor of air-borne transmission. The discussion includes a good deal of the history of each disease, notably smallpox. There is also a strong philosophic flavor, particularly to the latter portion of the book where the author attempts to look into the future. Arch. Path. **36**: 236, 1943. (C)

CONTENTS: Scope of preventive medicine. Air transfer of disease. Smallpox, diphtheria, common cold and others, pneumonia, streptococcus infections, rheumatic fever, tuberculosis. Natural amelioration. Raw material of health. The aging process.

Whooping Cough, *Lapin, Joseph H., M.D.* Charles C Thomas, Springfield, Ill., 1943, 238 pages.

A monograph presenting an extensive digest of the literature, and the author's personal experience with routine prophylaxis and follow-up, the treatment of con-

*Deceased.

tacts and ambulatory cases, and the hospital care of complications. Am. J. M. Sc. **206**: 415, 1943; Arch. Int. Med. **72**: 428, 1943; Arch. Path. **36**: 125, 1943. (C)

CONTENTS: Historic survey. Epidemiology. Bacteriology. Pathology. Immunology. Serology. Clinical manifestations. Hematology. Roentgenology. Complications. Diagnosis. Prophylaxis. Treatment. Public health considerations.

Brucellosis in Man and Animals, *Huddleson, I. Forrest, Ph.D.* Commonwealth Fund, New York, ed. 2,* 1943, 379 pages.

The second edition supplements the extensive observations on the disease in animals with the experience of physicians with the disease in human beings both in this country and in Europe. J. A. M. A. **122**: 1150, 1943; Arch. Int. Med. **71**: 905, 1943; Am. J. M. Sc. **206**: 269, 1943. (C)

Journal of Infectious Diseases, *Taliaferro, William H., Ph.D., Editor.* University of Chicago Press, Chicago.

For the John D. Rockefeller-McCormick Memorial Fund, University of Chicago. Deals with general phenomena, causation, and prevention of infectious diseases. Aims to occupy a special field and to include only such contributions as bear with reasonable directness on the topics indicated in the text. The biology and chemistry of the various pathogenic organisms, the physiology and anatomy of the morbid process that they initiate, and the hygienic and sanitary problems to which they give rise are considered to be especially within the scope of the undertaking. Original articles only. Current volume, 72. Bimonthly. (C)

14. Dentistry (L. dens, tooth.)

Accepted Dental Remedies. American Dental Association, Chicago, ed. 9, 1943, 304 pages.

By the Council on Dental Therapeutics. Contains a list of official drugs selected to promote a rational dental materia medica and description of acceptable nonofficial articles. Should help control another great American fraud. (C)

Principles of Orthodontics, *Salzmann, J. A., D.D.S.* J. B. Lippincott Co., Philadelphia, 1943, 674 pages.

Orthodontic care is a basic necessity to the physical welfare, mental stability, and social adjustment of the child. Aside from any cosmetic value, orthodontics involves oral hygiene and habits of eating, talking, and other oral-facial functions, as well as proper growth of the face, sinuses, and other related structures, and proper nasal ventilation.

The family dentist, whether or not he includes the treatment of malocclusion in his practice, and, even more, the pediatrician, who watches the growth and development of his patients, is, and should be, expected by parents to advise them on the orthodontic needs of their children. Early recognition and preventive treatment of incipient malocclusion lie within the scope of the general practitioner and pediatrician. He should be able to differentiate between the normal individual and the abnormal. J. A. M. A. **123**: 64, 1943. (E)

CONTENTS: Orthodontics and preventive dentistry. Orthodontics and prophylactic orthodontics. Growth and development. Bone growth and carpal index. Development and growth of head. Developmental anatomy and physiology of face and jaws. Development of dentition. Anomalies of tooth eruption and formation. Ontogenetic

*See Current Pediatric Literature, 1940-1941, J. PEDIAT. **19** (Part II): 21, 1941.

development of the occlusion of the teeth. Endocrines in relation to dentofacial deformities. Nutrition in relation to dentofacial development. Etiologic factors in dentofacial deformities. Classification and diagnosis of dentofacial anomalies. Differential diagnosis and prognosis. Orthodontic examination of the patient. Prevention and treatment of incipient malocclusion. Mechanotherapy in orthodontics. Dentofacial changes in orthodontics.

15. Dermatology (Gr. dérma, skin + logos, q.v.)

Skin Diseases in Children, *MacKee, George M., M.D., and Cipollaro, Anthony C., M.D.* Paul B. Hoeber, Inc., New York, 1936, 345 pages.

There are a number of cutaneous affections that are seen only in infancy and childhood; a few are peculiar to adolescence. Many of the chronic adult dermatoses begin in early life. By detecting these conditions in the early stage of evolution much can be done to prevent future suffering and disfigurement. Most of the skin diseases common to adults are also encountered frequently in children, but the symptom complex is likely to be modified by factors peculiar to youth. (E)

CONTENTS: Diseases in which pyogenic bacteria are important etiologic factors. Due to fungi. Due to animal parasites. The erythema group. Dermatitis medicamentosa. The eczema group. Scaling dermatoses and lichens. Benign and malignant new growths. Congenital defects. Injuries due to physical agents. Vesicular and bullous diseases. The tuberculosis group. Diseases caused by bacteria. Dystrophies. Pigmentary affections. Diseases of the sweat glands, sebaceous glands, hair and nails. Vascular diseases. Diseases of mouth. Care of normal skin. Syphilis.

16. Development (Fr. développer from envelopper, en + a stem of uncertain, perhaps celtic origin.) A progressive, or recessive, dynamic functional evolution, or involution, and integration of a part, or the whole, of an organism from its origin to maturity and completion of purpose.

Infant and Child in the Culture of Today, *Gesell, Arnold, M.D., Ilg, Frances L., M.D., Learned, Janet, and Ames, Louise B.* Harper & Brothers, New York, 1943, 399 pages.

An adequate philosophy of child development is needed to shape social planning and practices in home and school. It is clear that the concept of democracy embraces all aspects of everyday life. This volume considers the deep significance of a democratic culture for the psychologic welfare of infants and young children.

The concept of growth has much in common with the ideology of democracy. The growth characteristics of the early years are formulated in concrete detail with special reference to the factors of maturity which must determine our whole outlook upon the nature and needs of the individual child. These characteristics are so fundamental that not even a most modern culture can supersede them. A culture is refined through a discriminating recognition of these characteristics. The relationships between a child and his culture are highly reciprocal. Cultural anthropology begins at home, and this book deals with domestic behavior in its early relations with the social order.

This book is addressed to professional and lay workers in the field of early child welfare and education. The material is presented so as to make it serviceable in the guidance of young children whether or not they attend nursery school. No sharp lines have been drawn between home and nursery school and infants and preschool children. J. PEDIAT. **22:** 384, 1943; Am. J. Dis. Child. **66:** 226, 1943; Canad. M. A. J. **48:** 474, 1943. (E)

CONTENTS: Part I, Growth and Culture: The family in a democratic culture; how the mind grows; personality and acculturation; infants are individuals; self-regulation and cultural guidance; the cycle of child development. Part II, The Growing Child: A detailed description of various developmental levels. Part III, The Guidance of Growth: A developmental philosophy; the growth complex; child development and the culture of tomorrow.

Developmental Diagnosis, *Gesell, Arnold, M.D., and Amatruda, Catherine S., M.D.* Paul B. Hoeber, Inc., New York, 1941, 447 pages.

Medical education has sometimes been criticized for neglecting the normal characteristics of man at the expense of the pathologic. If we acknowledge that development as well as disease falls within the province of medicine and public health, the criticism has some force. The strong trend toward preventive and supervisory medicine obliges us to understand assets as well as liabilities, favorable as well as unfavorable symptoms. The pediatrician and the general practitioner have to deal increasingly with relatively well children. The developmental processes determine in equal measure the reaction patterns of the intact and the defective child. The present volume is devoted primarily to methods of diagnosis and to the applications which rest securely on diagnosis. J. A. M. A. **118:** 259, 1942. (E)

CONTENTS: Principles and methods. Defects and deviations of development. Protection of early child development. Examination technic. Growth trend chart. Examination equipment. Cinematic case studies.

The Neuromuscular Maturation of the Human Infant, *McGraw, Myrtle B., Ph.D.* Columbia University Press, New York, 1943, 140 pages.

A study of the relationship between normal structure and function, concerned primarily with sequential changes in specific functions, depicting those characteristics which reflect participation of the cerebral cortex in each function. Attempts to correlate schedules of developmental changes in overt behavior and motor activities common to infants with structural changes as determined by histologic analysis. The primary aim has been to depict those characteristics which reflect participation of the cerebral cortex in each function. Arch. Int. Med. **71:** 740, 1943; The Child **8:** 14, 1943. (E)

CONTENTS: Structural foundation of behavior. Neonatal behavior. Development of neuromotor activities. Some aspects of early sensory development. Individual development. Maturation and learning.

Babies Are Human Beings, *Aldrich, C. Anderson, M.D., and Aldrich, Mary M.* The Macmillan Co., New York, 1938, 128 pages.

An attempt to select from the complicated processes revealed by many observers a few of the simpler and more relevant facts of growth and to present them as a means of understanding babies. There are no specific instructions nor formulas except where development furnishes its own formula; and since the book is of interest to parents and those who care for young children, technical language has been avoided. (E)

CONTENTS: Beginnings. Baby's dilemma. The world comes to baby. The baby responds to the world. Babies are different. Orientation. Baby's way of eating. Baby's way of sleeping. Baby's way of eliminating. Among the do's and don't's. Implications of older children. Developmental schedule.

The Hormones in Human Reproduction, *Corner, George W., M.D.* Princeton University Press, Princeton, N. J., 1942, 265 pages.

The book is based on the Vanuxem Lectures, given at Princeton University in 1942. Describes for the general reader the reproduction of simple animals and thus leads up to the more complicated processes of higher animals and man, showing how the various organs and functions of the reproductive system are controlled and timed by means of the hormones. Discusses the nature of sex, heredity, and the development of the human embryo. Should be of value to the biologist and physician, as well as the layman. Am. J. M. Sc. **205:** 136, 1943. (C)

CONTENTS: Place of the higher animals and of mankind, in particular, in the general scheme of animal reproduction. Human egg and the organs that make and care for it. Ovary as timepiece. Hormone of preparation and maturity. A hormone for gestation. Menstrual cycle. Endocrine arithmetic. Hormones in pregnancy. Male hormone. Chemical structure of the sex gland hormones.

Monographs of the Society for Research in Child Development, *Sontag, L. W., Ph.D., Chairman, Editorial Board,* National Research Council, Washington, D. C.

Current volume, 8. (C)

Child Development (Journal), *Palmer, Carroll E., M.D., Chairman, Editorial Board,* National Research Council, Washington, D. C.

For the Society for Research in Child Development. Devoted to brief papers of current research in the child field. Current volume, 14. Quarterly. (C)

Child Development Abstracts and Bibliography (Journal), *Ciocco, Antonio, Chairman, Editorial Board,* National Research Council, Washington, D. C.

For the Society for Research in Child Development. Selected abstracts from current issues of journals. Current volume, 17. Bimonthly. (C)

17. Dictionaries (L. dictio, saying or word.)

Stedman's Practical Medical Dictionary, *Garber, Stanley Thomas, M.D.* Williams & Wilkins Co., Baltimore, ed. 15, 1942, 1,257 pages. J. A. M. A. **120:** 322, 1942; Am. J. M. Sc. **204:** 397, 1942.

American Illustrated Medical Dictionary, *Dorland, W. A. Newman, M.D.* W. B. Saunders Co., Philadelphia, ed. 19, 1941, 1,647 pages.

Webster's Collegiate Dictionary, *Neilson, William Allen, Editor in Chief.* G. & C. Merriam Co., Springfield, Mass., ed. 5, 1936, Merriam Series, 1,274 pages. (E)

18. Dietetics (Gr. díaita, a way of living.) Deals with the application of principles of nutrition to the feeding of individuals or groups.

Accepted Foods and Their Nutritional Significance. American Medical Association Press, Chicago, 1939, 492 pages.

Contains descriptions of those products which have been submitted to the Council on Foods and have been accepted. Includes the rules and regulations of the Council. (E)

Food and Beverage Analyses, *Bridges, Milton Arlanden, M.D., and Mattice, Marjorie R.* Lea & Febiger, Philadelphia, ed. 2, 1942, 344 pages.

The result of the effort of investigators who have searched the records in order to correlate and evaluate present available data. Where such data were lacking, original analyses were made and the results included. Includes also the analyses of canned and packaged foods, in addition to the common fresh and noncommercial products. Provides analytical data on the largest possible number of food factors in a readily understandable fashion.

The new data include tables on the acidity of foods, their fiber content, the occurrence of sulfur, bromine, calcium, oxalate, phytins, purins, available carbohydrates, and ionizable iron. The reaction of foods is covered by a table of pH values which

embodies all the common and many uncommon foods. There is a table of organic acids in fruits, vegetables, and a few miscellaneous items. Extensive information is given on the acid-ash and alkaline-ash factors. J. A. M. A. **120**: 573, 1942. (C)

19. Directories (ML. directorium.)

American Medical Directory. American Medical Association Press, Chicago, ed. 17, 1942, 2,801 pages.

A register of legally qualified physicians. Published biennially. National and interstate information. Directory of physicians and hospitals. Index of physicians. (C)

Directory of Medical Specialists, *Titus, Paul, M.D., Editor.* Columbia University Press, New York, ed. 2, 1942, 2,495 pages.

For the Advisory Board of Medical Specialists and the American Board of Pediatrics. J. PEDIAT. **21**: 287, 1942; Am. J. Dis. Child. **64**: 576, 1942. (E)

Standard Nomenclature of Disease and Standard Nomenclature of Operations, *Jordan, Edwin P., M.D., Editor.* American Medical Association Press, Chicago, ed. 3, 1942, 1,022 pages.

For the Committee on Nomenclature of Disease. Presents a logical clinical nomenclature. J. A. M. A. **120**: 1167, 1942; Am. J. M. Sc. **204**: 757, 1942; Bull. Johns Hopkins Hosp. **72**: 251, 1943. (C)

CONTENTS: Introduction. Instructions. Scheme of classification.

Social Work Year Book, 1943, *Kurtz, Russell H.* Russell Sage Foundation, New York, ed. 7, 1943, 764 pages.

A concise encyclopedia which undertakes to report the current status of organized activities in social work and related fields. Organization and practice in the various fields of social work should make possible an estimate of wartime activities leading into the postwar period. Published biennially. J. PEDIAT. **22**: 509, 1943; The Child **8**: 13, 1943. (C)

CONTENTS: Introduction. Topical articles. Directory of agencies.

Directory of Hospitals and Convalescent Institutions Engaged in Work for Crippled Children, *Shands, A. R., Jr., M.D., Director,* National Society for Crippled Children, Inc., Elyria, Ohio, 1942, 115 pages.

Gives information on health facilities and services for the care and treatment of crippled children in institutions. (C)

Tuberculosis Sanatorium Directory. National Tuberculosis Association, New York, 1942, 185 pages.

Lists tuberculosis hospitals, sanatoria, and general hospitals making provision for tuberculosis in the United States. Institutions are listed geographically with information for each on date of opening, rates, class of cases admitted, diagnostic and treatment facilities, resident staff, outpatient service, name of chief medical officer, method of application. Issued annually. (C)

20. Economics, Medical

Physicians and Medical Care, *Brown, Esther Lucile.* Russell Sage Foundation, New York, 1937, 202 pages.

One of a series dealing with the status of certain professions in the United States. Facts have been chosen for study that seem to explain why medicine has reached its present degree of effectiveness. A large part has been devoted to a discussion of the evolution of formal training and the problems incident to it. A useful survey of the whole practice of medicine as it existed up to the present. Not a statistic compilation of data. (C)

CONTENTS: Medical education. National associations. Number of physicians and demand for their services. Distribution of physician's income. New forms of medical service. Adequate medical care for all the people.

Medical Care (Journal), *Davis, Michael M., Ph.D., Editor.* Williams & Wilkins Co., Baltimore.

For the Committee on Research in Medical Economics. To disseminate information concerning the economic and social aspects of medicine. To promote a scientific approach to the subject and to stimulate practical action by the professions and the public in their common interest. Original articles, editorials, course of events, forum, book reviews, abstracts. Current volume, 3. Quarterly. (C)

21. Embryology (Gr. embryon [from, en, in + bryein, to swell] + logos, q.v.) Treats of the early formation, growth and development of the young organism, before the third month in the human.

Textbook of Embryology, *Jordan, Harvey Ernest, Ph.D., and Kindred, James Ernest, Ph.D.* D. Appleton-Century Co., Inc., New York, ed. 4, 1942, 613 pages.

An account of human development. Basically anatomic with occasional functional interpretation. J. A. M. A. **119:** 382, 1942; Am. J. M. Sc. **205:** 262, 1943. (C)

Human Embryology, *Krafka, Joseph, Jr., M.D.,* Paul B. Hoeber, Inc., New York, 1942, 395 pages.

One of a series of four texts on preclinical subjects. A short complete account of the development of man. Omits all references to comparative embryology, virtually all reference to causal factors in development, and all references to laboratory exercises. J. PEDIAT. **22:** 511, 1943. (E)

22. Endocrinology (Gr. endon, within + krinein, to separate + logos, q.v.)

Glandular Physiology and Therapy. American Medical Association Press, Chicago, 1942, 571 pages.

A symposium prepared under the auspices of the Council of Pharmacy and Chemistry. Important articles concerned with the endocrinology of the female productive mechanism. New aspects of knowledge of the adrenal and pituitary are discussed. Extraordinary advances have been made with reference to the antihormones. Of

special importance is the discussion of the interrelationship of various portions of the glandular apparatus. J. A. M. A. **119:** 985, 1942. (E)

The Journal of Clinical Endocrinology, *Hoskins, R. G., M.D., Managing Editor.* Charles C Thomas, Springfield, Ill.

For the Association for the Study of Internal Secretions. Original articles, selected abstracts, news and notes, and communications. Current volume, 3. Monthly. (C)

Endocrinology (Journal), *Astwood, E. B., Ph.D., Managing Editor.* Charles C Thomas, Springfield, Ill.

For the Association for the Study of Internal Secretions. Experimental papers and occasional limited editorial review articles, book reviews. Current volume, 32. Monthly. (C)

23. Ethnology (Gr. éthnos, nation + logos, q.v.) Treats of the division of mankind into races, their origin, distribution, relations and peculiarities.

The Biology of the Negro, *Lewis, Julian Hermann, Ph.D.* University of Chicago Press, Chicago, 1942, 433 pages.

Has no thesis to develop or disprove. It is an arranged assembly of the observed and reported facts concerning the comparative racial biology, including pathology, of the Negro. It is suggested that this be known as anthropathology, a comparison of races of man in regard to the expression of disease among them. Arch. Int. Med. **70:** 512, 1942; Bull. Johns Hopkins Hosp. **72:** 250, 1943. (C)

24. Eugenics (Gr. eû, well + genes, born.) Deals with influences that improve inborn or hereditary qualities of a race or breed.

Preface to Eugenics, *Osborn, Frederick.* Harper & Brothers, New York, 1940, 312 pages.

Sets forth briefly what science knows about heredity as a factor in individual differences. J. A. M. A. **116:** 658, 1941. (C)

CONTENTS: Significance of genetic inheritance. Psychologic studies of heredity and environment. Births and deaths: the background of eugenics. Toward a national population policy. Eugenic selection under influence of a favorable environment. Psychologic aspects of a eugenic environment. Eugenic reorientation of various social policies. Significance of the eugenics philosophy.

Eugenics Review (Journal), *Newfield, Maurice.* The Macmillan Co., New York.

For the Eugenics Society. Original articles, notes, book reviews, abstracts. Current volume, 35. Quarterly. (C)

25. Gastro-Enterology (Gr. gastér, belly + enteron, intestines + logos, q.v.)

An Introduction to Gastro-Enterology, *Alvarez, Walter C., M.D.* Paul B. Hoeber, Inc., New York, ed. 3, 1940, 778 pages.

Presents the modern physiologic approach to gastro-enterology. Supplies the clinician with a basic understanding of digestive tract phenomena seen in everyday

practice and thereby points the way to sound diagnosis and treatment in this field. A delightful book to read because of the writer's attractive style. An interesting final chapter, "On Books and Reading," shows his range of interest and a source of power. (C)

Gastro-Enterology (Journal), *Alvarez, Walter C., M.D., Editor.* Williams & Wilkins Co., Baltimore.

For the American Gastro-Enterological Association. Original articles, editorials, book reviews, abstracts. Current volume, 1. Monthly. (C)

26. Genetics (Gr. génesis, origin.) Deals with heredity and variation.

An Introduction to Medical Genetics, *Roberts, J. A. Fraser, M.B.* Oxford University Press, New York, 1940, 266 pages.

Follows the accepted plan of clinical teaching. Basic principles are restated fully and on this foundation is built up not a recapituation of the science of genetics, but an exposition of the applied science of medical genetics dealing with the human subject as observed in the community, in medical practice, and in the hospital. J. A. M. A. **115:** 2020, 1940. (E)

CONTENTS: Sources of material. Basis of organic inheritance. Dominant and intermediate inheritance. Recessive inheritance. Sex-linked inheritance. Single-factor inheritance. Genetic linkage. Variations in effect produced by genes. Multi-factor inheritance. Heredity as factor in causation of disease. Notes on recording genetic data.

Constitution and Disease, *Bauer, Julius, M.D.* Grune & Stratton, Inc., New York, 1942, 208 pages.

An unusual book of intense interest to pediatricians, based on lectures given at the University of Vienna. A correlation of facts observed in endocrinology and other branches of medicine to the particular situation encountered in individual patients. An interpretation of those observations in their application, taking into consideration not one or several organs of the patient, but the whole personality, both physical and mental. An adaptation of genetics to clinical medicine.

Based on the thesis that the potential energy of the germ plasm not only accounts for the development of a full-fledged being out of a fertilized human ovum, but also is at work throughout a whole lifetime; that the physiologic evolution and involution, the structure and function of organs, their individual relation, and the response to various stimuli depend on this potential energy; that deficiencies and abnormalities of this energy may be cooperative etiologic factors or the sole cause of diseases; that they account for the majority of congenital malformations. Am. J. M. Sc. **206:** 410, 1943. (C)

CONTENTS: Constitutional pathology and its general significance. Constitutional biologic inferiority of organs and tissues. The integrative systems of individual constitution. Classification of normal and abnormal constitution. Some major diseases with chiefly constitutional etiology. Principles of treatment, nonspecific therapy, pitfalls, and errors.

Genetics (Journal), *Rhoades, M. M., Editor.* Menesha, Wis.

Investigations bearing on heredity and variation. Original articles only. Current volume, 28. Bimonthly. (C)

27. Genito-Urology (Gr. génesis, procreation + oûron, urine + logos, q.v.)

Pediatric Urology, *Campbell, Meredith F., M.D., and Lyttle, John D., M.D.* The Macmillan Co., New York, 1937, 2 vols., 1,116 pages.

An encyclopedic work in a specialized field of growing importance in pediatrics. Especially significant since the relation between congenital anomalies of the kidney and hypertension is more established. The section on nephritis is by Dr. Lyttle. (E)

CONTENTS: Vol. I. Methods of examination and diagnosis. Obstructive uropathy. Anatomy, physiology, embryology, and anomalies of the urogenital tract. Urinary infections. Vol. II. Bright's disease. Genital disease. Urogenital injuries. Calculus disease. Tumors. Neuromuscular disease. Enuresis. Urosurgery.

28. Growth (AS, grōwan, to grow.) Progressive, dynamic, morphologic change in form, size or arrangement of a part or the whole of an organism.

Growth (Journal), *Reimann, Stanley P., M.D., Editor.* Philadelphia.

Official organ of the Society for the Study of Development and Growth for the coordination of studies of increase and development as general properties of nature. Publishes investigations in which the approach is through mathematics, physics, chemistry, genetics, embryology, philosophy, and anthropology, also studies of development in its several expressions, and of mass increase and the part played therein by nutrition, vitamins, and hormones. Original articles only. Current volume, 7. Quarterly. (C)

29. Gynecology (Gr. gynaikós, woman + logos, q.v.)

Pediatric Gynecology, *Schauffler Goodrich C., M.D.* The Year Book Publishers, Inc., Chicago, 1942, 384 pages.

Presents all that is pertinent and useful about the prepuberal female state. Discusses not only the pathologic conditions in this specialized field, but also the normal anatomy, physiology, and developmental processes. Calculated to be clinically helpful rather than scientifically exhaustive. Shows a comprehensive and pediatrically pleasing grasp of the psychologic factors. J. PEDIAT. 21: 286, 1942; Canad. M. A. J. 47: 498, 1942; Brit. M. J. 1: 541, 1943. (E)

CONTENTS: Special methods of investigation. External genitalia. Vagina. Vaginitis management and vaginal cervix. Disorders during adolescence and the onset of menstruation. Pelvic viscera. General surgical, special urologic and proctologic considerations. Social service and medicolegal aspects.

30. Health Education (AS, haelth, hale.)

Health Education. National Education Association, Washington, D. C., 1941, 368 pages.

Report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association with the cooperation of Advisory Committees. A guide for teachers in elementary and secondary schools and institutions for teacher education. (E)

CONTENTS: Aims and definitions. Trends in health problems. What the school can do. The meaning of health. Facts relating to child growth and development and to the protection and improvement of child health. Guilding health education. Plans and policies. Philosophy, psychology, and research. Processes of meeting learning situations. Activities and materials. Teacher preparation for health education.

Journal of Health and Physical Education, *Mitchell, E. D., Editor.* National Education Association, Washington, D. C.

For the American Association for Health, Physical Education, and Recreation. Articles, editorials, features, news. Current volume, 13. Ten issues annually. (C)

31. Hematology (Gr. haímatos, blood + logos, q.v.)

Hemorrhagic Diseases and the Physiology of Hemostasis, *Quick, Armand J., M.D.* Charles C Thomas, Springfield, Ill., 1942, 340 pages.

Presents and correlates the experimental and theoretic aspects of hemostasis; summarizes the present knowledge concerning the important hemorrhagic diseases; and brings together the contributions of the laboratory, especially in the field of the coagulation of the blood and the clinical information on the principle hemorrhagic diatheses. The book is an expansion of the Beaumont Lectures given in Detroit in 1941. J. A. M. A. **122:** 266, 1943; Am. J. M. Sc. **205:** 432, 1943; Arch. Path. **35:** 355, 1943; Arch. Int. Med. **72:** 427, 1943. (C)

CONTENTS: History and general consideration of the coagulation mechanism. Thrombin. Prothrombin. Fibrinogen. Thromboplastin. Platelets. Anticoagulants-heparin. Thrombocytopenic purpura haemorrhagica. Hereditary hemorrhagic diatheses: pseudohemophilia and telangiectasia. Afibrinogenemia. Hemophilia. The hemorrhagic diathesis of avitaminosis K: obstructive jaundice, biliary fistula, and liver damage; the bleeding disease of the newborn and toxic sweet clover disease. Classification of hemorrhagic diseases.

Clinical Hematology, *Wintrobe, Maxwell M., M.D.* Lea & Febiger, Philadelphia, 1942, 792 pages.

Brings together accumulated information in the field of hematology in a systematic and orderly form; describes the newer methods which are of practical value; outlines details of differential diagnosis; describes the indications for, and method of, treatment and makes clear the nature of the underlying physiologic disturbances. Includes a chapter on anemias in infancy and childhood. Bull. Johns Hopkins Hosp. **71:** 184, 1942. (C)

32. Heredity (L. hereditas, heirship.) Deals with transmission of physical and psychic characters of parents to their offspring.

Journal of Heredity, *Cook, Robert C., Managing Editor.* American Genetic Association, Washington, D. C.

Devoted to promoting a knowledge of the laws of heredity and their application to the improvement of plants, animals, and human racial stocks. Articles, notes, reviews. Current volume, 34. Monthly. (C)

33. Histology (Gr. histós, tissue + logos, q.v.)

Textbook of Histology, *Maximow,* Alexander A., and Bloom, William, M.D.* W. B. Saunders Co., Philadelphia, ed. 4, 1942, 695 pages.

Provides a description of the minute structures of the human body and the morphologic evidences of its functions, introducing as much of the data of physi-

*Deceased.

ology, pathology, and experimental zoology as seems pertinent and desirable in the limits of the field of histology. This is one of the basic pillars of clinical medicine, including pediatrics. Should be available for reference. J. A. M. A. **120**: 1168, 1942. (C)

34. History of Medicine (Gr. histor, knowing.)

Source Book of Medical History, *Clendening, Logan, M.D.* Paul B. Hoeber, Inc., New York, 1942, 685 pages.

Attempts to give a comprehensive survey of classic medical writings in chronologic order. A special feature is the inclusion of material from lay literature that shows a contemporary view of medical life at different ages. A chapter on pediatrics includes Paulus Bagellardus' *The Little Book of Diseases of Children,* Nicholas Rosen von Rosenstein's *The Diseases of Children and Their Remedies,* Francis Glisson's *De Rachitide,* William Cadogan's *On Nursing and the Management of Children,* and Eduard Heinrich Henoch's *Lectures on Diseases of Children.* (C)

Pediatrics of the Past, *Ruhräh,* John.* Paul B. Hoeber, Inc., New York, 1925, 592 pages.

An anthology, chrestomathy, and source book. Describes important individuals and the medical times in which they lived. Frequent quotation of the original works with comments and annotations by the author. Necessary and delightful reading with Dr. Ruhräh on every page. An important foreword by Dr. Fielding H. Garrison. (E)

History of Paediatrics, *Still,* Sir George Frederick.* Oxford University Press, New York, 1931, 526 pages.

It is good to know the past of medicine; its failures and its follies, its strivings and its successes. They are chastening and stimulating; and if this work serves to encourage study of this subject and to help any who are investigating the particular department of medicine with which the book deals, it will have accomplished its purpose. (E)

Bulletin of the History of Medicine (Journal), *Sigerist, Henry E., M.D., Editor.* Johns Hopkins Press, Baltimore.

For the American Association of the History of Medicine and the Johns Hopkins Institute of the History of Medicine. Original articles, notes, news, abstracts, book reviews. Current volume, 13. Ten issues annually. (C)

35. Immunology (L. immunitas, fr. im-not + munia, obligation + logos, q.v.)

Clinical Immunology, Biotherapy and Chemotherapy, *Kolmer, John A., M.D., and Tuft, Louis, M.D.* W. B. Saunders Co., Philadelphia, 1941, 941 pages.

Because of the intimate relationship of infection, immunity, biotherapy, and chemotherapy to the diagnosis, prevention, and treatment of disease, these subjects

*Deceased.

have been brought together under the same cover. The newer knowledge accumulated during the extraordinarily fruitful period of the past fifteen years is included because it should become an important and very practical part of the professional equipment of all physicians. Useful discussion of allergy.

Part I is devoted to the general aspects of infection, immunity, biotherapy, and chemotherapy, an understanding and knowledge of which is of such fundamental importance to the clinical or practical applications of this subject of diagnosis, prophylaxis, and treatment of disease which are covered in Part II. (C)

Journal of Immunology, *Editorial Board.* Williams & Wilkins Co., Baltimore.

For the American Association of Immunologists. Original articles only. Current volume, 47. Monthly. (C)

36. Laboratory Diagnosis

Approved Laboratory Technic, *Kolmer, John A., M.D., and Boerner, Fred.* D. Appleton-Century Co., Inc., New York, ed. 3, 1941, 921 pages.

Clinical pathologic, bacteriologic, mycologic, parasitologic, serologic, biochemical, and histologic. Prepared under the auspices of the American Society of Clinical Pathologists in that the technic of each method has been definitely approved by at least five members of the Society. Aims to establish standards for the performance of various laboratory examinations. Numerous collaborators on special subjects. (C)

Clinical Laboratory Diagnosis, *Levinson, Samuel A., M.D., and MacFate, Robert P., Ph.D.* Lea & Febiger, Philadelphia, ed. 2, 1943, 980 pages.

Presents a suitable review of clinical laboratory diagnosis sufficient to meet general needs. Compiled from an outline distributed to students in clinical pathology at the University of Illinois. The book should be an aid to the study of those cases requiring laboratory methods. The preferred technic is given and only occasionally are other well-known methods mentioned. Presents simple procedures for the usual laboratory routine which will give reliable results in the hands of both the trained and the occasional laboratory worker. A chapter on pediatric procedure has been contributed by Dr. H. G. Poncher, describing the difference between the adult and child findings with special attention to the subject of hematology in the infant. The present edition brings up to date the material with necessary changes. J. A. M. A. **122:** 345, 1943; Am. J. M. Sc. **205:** 881, 1943. (C)

CONTENTS: Mouth. Stomach. Duodenum and related organs. Intestines. Metabolism. Chemical analysis of the blood. Kidneys. Chemical analysis of the urine. Hematology. Immunology and serology. Cerebrospinal fluid. Transudates and exudates. General bacteriology. Sputum. Skin tests and other biologic examinations. Laboratory methods in pediatric procedures. Milk and water analysis. Histologic technic. Legal medicine and toxicology.

Clinical Diagnosis by Laboratory Methods,* *Todd,† James Campbell, and Sanford, Arthur Hawley, M.D.* W. B. Saunders Co., Philadelphia, ed. 10, 1943, 911 pages.

The chief changes are in the inclusion of new material. Mention may be made of the fluorescent dye method for staining tubercle bacilli; the significance of porphyrins in the urine; methods for determining the quantity of sulfonamides and sulfones in the blood and for the identification of sulfonamide crystals in the urine; the Quick

*See Current Pediatric Literature, 1940-1941, J. PEDIAT. **19:** (Part II): 14, 1941.
†Deceased.

prothrombin test; the importance of hemoconcentration; the significance of various inclusion bodies; a new arrangement of the material on rickettsial diseases; diseases due to fungi; and Brewer's new methods for growing anaerobic organisms. (C)

37. Medicine, General (L. medicus, physician.)

Osler's Principles and Practice of Medicine, *Christian, Henry A., M.D.* D. Appleton-Century Co., Inc., New York, ed. 14, 1942, 1,475 pages.

In this fourteenth semicentennial edition there is arrangement of contents and much that is new, but the new has been added only after experience has seemed to indicate that it is worth while. The editor believes that the new should not appear because it is new, but because its value has seemed to have been demonstrated by experienced clinicians; he believes that there is an advantage in presentation by a single author, who has studied the reports of others in the light of his personal knowledge and experience and presents the various subjects of the text with a unity of critical thought as is not possible in multiple authorship. J. A. M. A. **120:** 1075, 1942; Am. J. M. Sc. **205:** 429, 1943; Brit. M. J. **1:** 163, 1943. (E)

The Modern Treatment of Syphilis, *Moore, Joseph Earle, M.D., Editor.* Charles C Thomas, Springfield, Ill., ed. 2, 1943, 717 pages.

A reprint except for a rewritten chapter on "Intensive Arsenotherapy of Early Syphilis" and a new chapter on "Venereal Disease Control in the Army and Navy." Collaborators are Kemp,* Jarold E.; Eagle, Harry, M.D.; Padget, Paul, M.D.; Goodwin, Mary Stewart, M.D.; and Reynolds, Frank, M.D. Dr. Goodwin has revised the chapters dealing with the treatment of the syphilitic pregnant woman and the antenatal prevention of congenital syphilis. Am. J. Dis. Child. **63:** 422, 1942; J. A. M. A. **118:** 91, 1942. (C)

Clinical Diabetes Mellitus and Hyperinsulinism, *Wilder, Russell M., M.D.* W. B. Saunders Co., Philadelphia, 1941, 459 pages.

Limited to clinical considerations only. Includes not only the subject of diabetes mellitus, but also disturbances of insulin secretion. (C)

CONTENTS: Sugar of the blood. Diabetes mellitus: definition and diagnosis. Pathogenesis and prevention. Prognosis and course. Requirements for effective therapy. Substitution therapy: insulin and protamine-zinc insulin. Diet therapy. Diabetic cookery. Other therapeutic procedures. Acidosis and coma. Complications of diabetes: infections; surgical operations; genitourinary and gynecologic; pregnancy; diseases of the thyroid and other endocrine glands; eyes; nervous system; skin; digestive organs; hemochromatosis. Arteriosclerosis and diseases of the heart. Hyperinsulin, definition and diagnosis; incidence and pathology; symptoms and course; treatment.

Diseases of Metabolism, *Duncan, Garfield G., M.D., Editor.* W. B. Saunders Co., Philadelphia, 1943, 985 pages.

A practical consideration of the physiology of metabolism, the pathologic physiology as observed in the various diseases of metabolism, and the methods of detecting and of treating these disturbances is presented. The gap is bridged between the investigator employing chemical and physiologic methods and the physician who applies the results of laboratory investigation in the identification and treatment of disease.

*Deceased.

The authors have simplified their respective phases of the subject as much as is possible to do. Clinical considerations are presented in detail. Laboratory data are considered in the light of being aids in understanding, diagnosis, and the conduct of treatment of these diseases. Am. J. M. Sc. **206:** 132, 1943; Arch. Int. Med. **70:** 687, 1942; Bull. Johns Hopkins Hosp. **72:** 250, 1942. (C)

CONTENTS: Carbohydrate metabolism. Protein metabolism. Lipid metabolism. Mineral metabolism. Water balance in health and disease. Nutritional and metabolic aspects of disorders of the blood. Vitamins and avitaminoses. Undernutrition. Obesity. Xanthomatoses, glycogen disease, and disturbances of intermediary metabolism. Gout. Hyperinsulinism. Diabetes insipidus. Melituria. Diabetes mellitus.

The Epidemiology of Rheumatic Fever, *Paul, John R., M.D.* Metropolitan Life Insurance Co., New York, ed. 2, 1943, 163 pages.

This revision has been done under the direction of a Committee of the American Heart Association. General information about this disease has increased so much and the point of view has changed so radically in the past twelve years that the present review is in reality a new monograph. In addition to the subject of the epidemiology of rheumatic fever, the work also includes some of the public health aspects. J. PEDIAT. **22:** 635, 1943; Am. Heart J. **26:** 287, 1943. (C)

CONTENTS: Nomenclature, definitions and discussions. Historic review. Hemolytic streptococcal infections and rheumatic fever. Epidemiologic associations between rheumatic fever and acute hemolytic streptococcal infections. The frequency of occurrence and general importance of rheumatic fever. Geographic prevalence and climatic influences. Age, sex and "racial" prevalence. Living conditions. The rheumatic family. General public health aspects of rheumatic fever. The London County Council's Rheumatism Scheme. Lines along which public health procedures may develop, Rutstein, D. D., M.D. General considerations for the long-term care of patients with rheumatic fever and rheumatic heart disease, Jones, T. D., M.D. Methods of determination of incidence and prevalence of rheumatic fever, Dublin, T. D., M.D. Technic of physical examinations for determination of rheumatic heart disease rates among school children. The rheumatic family—methods of selection and study. Technic which has been used for morbidity surveys within small communities.

Rheumatic Fever, *Wilson, May G., M.D.* Commonwealth Fund, New York, 1940, 595 pages.

Studies of the epidemiology, manifestations, diagnosis, and treatment of the disease during the first three decades. Presents in a systematic way the author's observations and the factual information obtained relative to this disease. Not a textbook nor a comprehensive critical review. Am. J. Dis. Child. **60:** 1450, 1940. (C)

CONTENTS: Epidemiology and etiology of rheumatic fever. Manifestations of childhood rheumatism, clinical and pathologic. Course of rheumatic fever in first three decades. Diagnosis of rheumatic heart disease in children. Care and management of the rheumatic child.

Medical Clinics on Bone Diseases, *Snapper, I., M.D.* Interscience Publishers, Inc., New York, 1943, 225 pages.

A monograph presenting observations and x-ray pictures of a group of diseases of the skeleton which are of general medical interest. (C)

CONTENTS: Recklinghausen's disease: hyperparathyroidism. Hyperplasia of the parathyroids secondary to other diseases. Avitaminosis D: fetal rickets, infantile rickets, late rickets and osteomalacia. Paget's disease of the bone. Lipoid granulomatosis of the bones. Xanthomatosis of the bones. Gaucher's disease. Multiple myeloma.

Pain Mechanisms, *Livingston, W. K., M.D.* The Macmillan Co., New York, 1943, 253 pages.

Deals with the clinical aspect of pain and, particularly, the study and interpretation of causalgia and its related states. Includes some of the anatomy and physiology

of pain conduction, touches on the psychologic aspects of sensory perception and goes into, in a tentative fashion, the field of the neurophysiologist and psychosomatic medicine. Follows mostly though the viewpoint of the author, the neurosurgeon. The discussions are given in a direct, informal, and personal manner. (C)

Pain, *Lewis, Sir Thomas, F.R.S.* The Macmillan Co., New York, 1942, 192 pages.

Pain, like similar subjective things, is known to us by experience, chiefly human, and is described by illustration. Our knowledge of its sources, of the nerve paths conveying it, has been built up, and will continue to be built up, chiefly by observations upon man. Reviews modern ideas of the mechanism of human pain in a readable form that will stimulate interest and inquiry. A distinct contribution to psychosomatic medicine with emphasis on the somatic side from one of the great exponents of clinical scientific investigation. Am. J. M. Sc. **204:** 592, 1942; Brit. M. J. **2:** 725, 1942. (C)

CONTENTS: Pain-sensitive tissues. Anatomic basis of pain. Sensory systems: types of pain. Two systems of pain nerves in skin. Erythralgia. Nocifensor tenderness. Cutaneous tenderness and nerve injuries. Pain and tenderness in ischemic muscle. Excitants of pain nerves. Referred pain. Referred manifestations of somatic and visceral disease (origin compared). Pain of visceral disease. Tenderness and rigidity in visceral disease. Source of pain and associated reflexes in visceral disease. Principles in the clinical use of pain.

Bronchiectasis, *Lisa, James R., M.D., and Rosenblatt, Milton B., M.D.* Oxford University Press, New York, 1943, 190 pages.

Since the author states in summary that the vast majority of cases are sequelae of bronchopneumonia in childhood, the matter should be of great pediatric interest. The close relationship to foreign bodies in the lung and to other occasional lung infection, for example, whooping cough, is also of importance. Based on necropsy study of 109 cases. J. A. M. A. **122:** 641, 1943; Am. J. M. Sc. **206:** 135, 1943; Bull. Johns Hopkins Hosp. **73:** 63, 1943. (C)

CONTENTS: Anatomy of the bronchi. Physiology of the bronchi. Theories of pathogenesis. Pathology. Pathology—studies at city hospital. Pathogenesis. Bacteriology. Clinical aspects. Treatment.

Nervousness, Indigestion and Pain, *Alvarez, Walter C., M.D.* Paul B. Hoeber, Inc., New York, 1943, 488 pages.

Successor to *Nervous Indigestion.* Deals with sick and unhappy persons, their symptoms and the meaning of their symptoms, the handling of these patients, and with the puzzling and poorly understood abdominal discomforts and indigestions. It deals also with related aspects of other constitutional conditions, especially mental illness. A real exposition of psychosomatic medicine. Full of chatty informal discussions suitable for young physicians, for whom the book is written, and as well for older ones who still ask for help and suggestions. (E)

Journal of the American Medical Association, *Fishbein, Morris, M.D., Editor.* American Medical Association Press, Chicago.

Covers all the medical sciences and matters of general medical interest. Current volume, 123. Weekly. (E)

Medicine (Journal), *Chesney, Alan M., M.D., Managing Editor.* Williams & Wilkins Co., Baltimore.

Analytic reviews of general medicine, neurology and pediatrics. Current volume, 22. Quarterly. (E)

Archives of Internal Medicine (Journal), *Gilbert, N. C., M.D., Chief Editor.* American Medical Association Press, Chicago.

For the advancement of scientific medicine in the United States and for the reporting of research and observation in the domain of internal medicine. Original articles, reviews. Current volume, 72. Monthly. (E)

American Journal of Medical Sciences, *Krumbhaar, Edward B., M.D., Editor.* Lea & Febiger, Philadelphia.

Original articles, proceedings, reviews, abstracts, book reviews. Current volume, 206. Monthly. (C)

Journal of Clinical Investigation, *Gamble, James L., M.D., Editor in Chief.* Science Press Printing Co., Lancaster, Pa.

For the American Society for Clinical Investigation. Designed for original investigations dealing with or bearing on the problems of disease in man. Original articles only. Current volume, 22. Bimonthly. (C)

Journal of Experimental Medicine, *Rous, Peyton, M.D., and Gasser, Herbert S., M.D., Editors.* Rockefeller Institute for Medical Research, New York.

Original articles only. Current volume, 78. Monthly. (C)

Proceedings of the Society for Experimental Biology and Medicine (Journal), *Goldforb, A. J., Ph.D., Editor.* New York.

Original articles. Current volume, 53. Nine issues annually. (C)

37a. Medicine, Preventive

Preventive Medicine in Modern Practice, *Miller, James Alexander, M.D., Baehr, George, M.D., and Corwin, E. H. L., Ph.D., Editors.* Paul B. Hoeber, Inc., New York, 1942, 851 pages.

Dedicated to the practicing physician and is aimed to draw his attention to the possibilities afforded him in that marginal land between public health and medicine and to outline the methods by which they can be realized. Combines in one volume the clinical and environmental aspects of health problems in a manner suited to the needs of both the general practitioner and the specialist. The main body of the book is of a clinical nature. The problems of childhood are discussed by Drs. S. Z. Levine and W. M. Schmidt, the psychiatric problems by Dr. Leo Kanner. Discusses the preventive aspects of obstetrics and other conditions peculiar to women; the various infections and infestations; tuberculosis and venereal diseases; occupational, degenerative, and dermatologic diseases; and conditions arising in the oral cavity and in the eye, ear, and nose. Indications for preventive surgery and convalescence are described as well as certain aspects of allergy, drug addiction, and alcoholism. In addition, the book contains several sections dealing with the problems of housing, waste disposal, ventilation, and air conditioning, the control of disease sectors, eugenics, health laws, social provision for illness, health service organizations, and other matters. (E)

37b. Medicine, Tropical

Stitt's Diagnosis, Prevention and Treatment of Tropical Diseases, *Strong, Richard P., M.D.* The Blakiston Co., Philadelphia, ed. 6, 1942, 2 vols., 1,747 pages.

"Tropical diseases" occur commonly or most frequently in tropical countries, although many of them are encountered from time to time and some are even endemic in countries with temperate climates. Summarizes the knowledge, not only of the clinical manifestations regarding tropical diseases and their treatment, but also of whatever zoologic aspects and laboratory measures as are of importance in connection with their transmission, diagnosis, and prevention. Brief consideration has been given to the more important cosmopolitan diseases that may be encountered in warm countries. (C)

38. Mental Hygiene

Mental Hygiene (Journal), *Stevenson, George S., M.D., Editor.* National Committee for Mental Hygiene, Inc., Albany, N. Y.

Aims to bring dependable information to everyone whose interest or whose work brings him into contact with mental problems. Original articles, book reviews, notes and comments, abstracts. Current volume, 27. Quarterly. (E)

Understanding the Child (Journal), *Elkind, Henry B., M.D., Editor.* National Committee for Mental Hygiene, New York.

A magazine for teachers. Articles, editorials, news. Current volume, 12. Quarterly. (C)

39. Miscellaneous

Drug Products, *Herrick, Arthur Donald.* Revere Publishing Co., New York, 1942, 462 pages.

Should assist those concerned in the trade in food and drugs to observe the spirit as well as the letter of the law. Written primarily for the legal profession and the manufacturer. Should be useful also to the medical profession which is primarily concerned with the protection of the public. J. A. M. A. **121**: 221, 1943. (C)

CONTENTS: Products subject to the act. Misbranded products. False and misleading labeling. Packaged products. Information labeling. Adequate directions and warning against misuse. Packaging. Fraudulent and dangerous products. Label display and prominence. Products exempt from labeling. Adulterated, contaminated, and harmful products. Official drugs. Maintenance of nonofficial standards. New drugs and submission of application. Refusal and suspension. Cosmetics.

The Contribution of Greek to English, *Brown, Charles Barrett.* Vanderbilt University Press, Nashville, Tenn., 1942, 310 pages.

The possession of an extensive vocabulary is not only an important contributory factor to success but the usual concomitant of it. Arranged in dictionary style, which it complements, giving the Greek word, so as to encourage further word study. (C)

Science (Journal), *Cattell, J. McKeen, Ph.D., Editor.* Science Publishing Co., Lancaster, Pa.

For the American Association for the Advancement of Science. Miscellaneous articles and current information in the field of general science. Current volume, new series, 98. Weekly. (C)

40. Neonatal Period (Gr. néos, new + L. natus, born.)

Physiology of the Fetus, *Windle, William Frederick, Ph.D.* W. B. Saunders Co., Philadelphia, 1940, 249 pages.

Assembles and summarizes scattered physiologic observations on fetuses. Provides a supplement in embryology to stress functional aspects of development for those in allied fields who are interested in problems of behavior and who desire knowledge of prenatal physiology. J. PEDIAT. **18:** 288, 1941; Am. J. Dis. Child. **61:** 418, 1941. (E)

CONTENTS: The fetal heart: circulation and blood. Respiration and respiratory movements. Digestive system, kidney, and fluids. Skin and muscles. The genesis of function in the nervous system and conditions regulating fetal nervous activity. Motor reactions and senses. Endocrine glands. Nutrition and metabolism.

The Premature Infant, *Hess, Julius H., M.D., and Lundeen, Evelyn H., R.N.* J. B. Lippincott Co., Philadelphia, ed. 2, 1941, 309 pages.

Presents something of the practical experience gained from work in the Premature Infant Station of the Sarah Morris Hospital. Coordinated with what medical science has to offer today. Am. J. Dis. Child. **63:** 205, 1942; J. A. M. A. **118:** 1420, 1942; Am. J. M. Sc. **206:** 131, 1943. (E)

41. Neurology (Gr. néuron, nerve + logos, q.v.)

Diseases of the Nervous System, *Ford, Frank R., M.D.* Charles C Thomas, Springfield, Ill., 1937, 953 pages.

Analyzes all available information about common neurologic disorders of childhood and develops a classification based primarily upon etiology with due emphasis upon clinical features rather than upon a purely anatomic classification, as is customary. Gives the essential clinical features in each condition with discussions. Includes all the conditions which occur in childhood, not merely those which are peculiar to childhood, and neurologic complications of diseases not primarily neurologic. (E)

CONTENTS: Examination of nervous system. Clinical aspects of anatomy and physiology of nervous system. Prenatal diseases. Heredofamilial and degenerative diseases. Infections and parasitic invasions. Toxic and metabolic disorders. Vascular lesions and circulatory disorders. Neoplasms and related conditions. Injuries by physical agents. Epilepsies and paroxysmal disorders. Diseases of the automatic system. Diseases of muscles. Syndromes and symptom groups.

Atlas of Electroencephalography, *Gibbs, Frederic A., M.D., and Gibbs, Erna L.* Privately published, Boston, 1940, 221 pages.

Furnishes eye training for the beginner in electroencephalography so that he may have an appreciation of the range of normal and be able to recognize more or less obvious abnormalities; provides a text which describes the technic of electroencephalography and gives sufficient information to make the figures understandable; furnishes the expert with a compact and yet fairly complete set of sample electroencephalograms for teaching and reference. J. A. M. A. **117:** 233, 1941. (C)

CONTENTS: History. Similarity of activity of cortex to other tissues. Technic. Infants, children and adults. Epilepsy. Other cerebral disorders. Localization of gross intracranial lesions.

Injuries of the Skull, Brain and Spinal Cord, *Brock, Samuel, M.D., Editor.* Williams & Wilkins Co., Baltimore, ed. 2, 1943, 616 pages.

A series of comprehensive monographs by twenty-three authors on neurology, psychiatry, neurosurgery, radiology, and forensic medicine as far as these subjects

relate to injuries of the skull, brain, and spinal cord. Obstetrics and pediatrics (the latter by Dr. Bronson Crothers) are represented in the field of birth injury.

The most important changes in the new edition are concerned with chemotherapy and the results of electroencephalography in cases of head injury. Arch. Path. **36:** 424, 1943. (C)

Anatomy of the Nervous System, *Ranson,* Stephen Walter.* W. B. Saunders Co., Philadelphia, ed. 7, 1943, 520 pages.

This revision had been completed entirely by Dr. Ranson before his death and, therefore, represents his latest thoughts in this field. Dr. Sam. L. Clark was selected by Dr. Ranson as his successor in revising the book in the future. Presents the dynamic rather than the static point of view, emphasis being placed on the developmental and functional significance of structure. J. A. M. A. **122:** 776, 1943. (C)

Anatomy of the Nervous System, *Larsell, Olof, Ph.D.* D. Appleton-Century Co., New York, 1942, 443 pages.

A textbook from the developmental and functional point of view, and atlas of the nervous system of man. Includes a comprehensive account of structure with enough physiology to give functional significance to the anatomic features. Intended primarily for medical students but should be equally useful to pediatricians who, at least at times, must reorient themselves in the intricate and complex structures of the nervous system. The book is characterized by simplicity of outline, clearness, brevity, and completeness. (C)

Human Neuroanatomy, *Strong, Oliver S., Ph.D., and Elwyn, Adolph.* Williams & Wilkins Co., Baltimore, 1943, 417 pages.

The first part takes up the general organization of the nervous system, its embryology and histologic structure, the organization and segmental distribution of the peripheral nerve elements. The second and larger part is devoted to the architectonics of the central nervous system. (C)

42. Nursing, Pediatric

Nursing of Children, *Sellew, Gladys, R.N.* W. B. Saunders Co., Philadelphia, 1942, 579 pages.

J. PEDIAT. **21:** 285, 1942; Am. J. Dis. Child. **64:** 574, 1942. (C)

Communicable Disease Nursing, *Lynch, Theresa I., R.N.* The C. V. Mosby Co., St. Louis, 1942, 678 pages.

In addition to presenting the technical phases of communicable disease nursing, attempts to show the part the nurse may play in the community by aiding in the prevention and control of communicable diseases. The subject matter includes the diseases suggested for study in *The Curriculum Guide for Schools of Nursing,* published by the National League of Nursing Education, and also most of those listed in the brochure, *The Control of Communicable Diseases.* J. PEDIAT. **20:** 535, 1942; Am. J. Dis. Child. **63:** 828, 1942. (C)

*Deceased.

Nursing Care of Communicable Diseases, *Pillsbury, Mary Elizabeth, R.N.* J. B. Lippincott Co., Philadelphia, ed. 6, 1942, 604 pages.

The new *Curriculum Guide for Schools of Nursing,* prepared for the National League of Nursing Education, stresses the importance of a groundwork in microbiology and in community problems of disease prevention and control before the student engages upon a study of the theory and practice of communicable disease nursing. The book follows this thought in its discussion of the causal organism, its effect upon the body, and its destruction both within the body and abroad in the community. Stress is laid on the nurse as a teacher of health and as a factor in the control of communicable disease. (C)

Nursing in Prevention and Control of Tuberculosis, *Hetherington, H. W., M.D., and Eshleman, Fannie, R.N.* G. P. Putnam's Sons, 1941, 316 pages.

Furnishes information that a nurse should have at her disposal in order to play her part in the control of tuberculosis. Summarizes the present-day concepts as they are applied to the nursing of the tuberculosis patient and the health supervision of the patient's family. (C)

CONTENTS OF INTEREST TO PEDIATRICIANS: Tuberculosis in infancy and childhood. Case finding. Prevention of contagion. Family health service and case study. Rehabilitation.

43. Nutrition.

The science of the processes by which foods are absorbed and disposed of in body metabolism. The static condition resulting from the metabolic process by which living matter in a part or the whole exists at a given period in its environment.

Nutrition and Diet in Health and Disease, *McLester, James S., M.D.* W. B. Saunders Co., Philadelphia, ed. 4, 1943, 849 pages.

Revises dietary principles in line with the rapid and startling advances in the field of nutrition and, in so far as possible, anticipates further developments.

The chapter on vitamins has been largely rewritten and the nomenclature revised; newly discovered vitamins, such as cholin, biotin, and pantothenic acid, have been added. The discussion of the mineral elements has been enlarged and the trace elements included. The requirements of vitamins, minerals, and other nutritive essentials has been revised to accord with the figures given in the table of *Recommended Daily Allowances* constructed by the Food and Nutrition Board of the National Research Council, and a copy of this table is included. Changes in the distribution and composition of the commoner foods, particularly those changes necessitated by the exigencies of the war, such as the introduction of enriched flour, are discussed. The newer knowledge of the storage and processing of foods and the losses in nutrients thus entailed are also included. That part of the book which deals with diet and disease, notably the chapter on deficiency diseases, has been critically revised. A section on the feeding of the aged and, since it is believed that the present world conflict will be won or lost in the industrial plants of the nation, a chapter on nutrition in industry has been added. A short chapter on the feeding of infants has been prepared by Dr. P. C. Jeans. (C)

Journal of Nutrition, *Cowgill, George R., Ph.D., Editor.* Wistar Institute of Anatomy and Biology, Philadelphia.

For the American Institute on Nutrition. Publishes original researches in the field of nutrition and occasional reviews of literature on topics with which the Journal is concerned. Original articles only. Current volume, 26. Monthly. (C)

44. Office Management

The Secretary's Handbook, *Taintor, Sarah Augusta, and Monro, Kate M.* The Macmillan Co., ed. 6, 1941, 540 pages.

Intended primarily for secretaries whose duties include the writing of letters and other business forms. A reference book containing authoritative usage.

The material is divided into two parts: the first containing rules with illustrations of correct form in English; the second consisting of various types of letters relating to business, social, and official usage, as well as other forms of business writing often required of the secretary. These include, among other types, the making of resolutions, the writing of minutes, the framing of petitions, and the compiling of reports. (E)

Gregg Medical Shorthand Manual, *Smither, Effie B.* The Gregg Publishing Co., Chicago, ed. 2, 1942, 191 pages.

Aims to answer some of the questions that arise in the mind of the medical secretary and offers some well-tried suggestions for acquiring accuracy in a field of highly technical and specialized words. Not a medical dictionary in shorthand; assumes a thorough mastery of shorthand principle. The words have been chosen from the point of view of the shorthand. A companion book to *The Medical Stenographer.** J. A. M. A. **121:** 160, 1943. (C)

45. Ophthalmology (Gr. ophthalmós, eye + logos, q.v.)

Eye Manifestations of Internal Diseases, *Tassman, I. S., M.D.* The C. V. Mosby Co., St. Louis, 1942, 542 pages.

Undertakes to bridge the gap between eye manifestations and the other medical aspects of internal diseases. Much of the material is of direct value in pediatrics, including that on congenital and hereditary manifestations, tuberculosis, avitaminoses, and intracranial tumors. J. A. M. A. **119:** 1232, 1942; Arch. Int. Med. **70:** 512, 1942; Bull. Johns Hopkins Hosp. **71:** 185, 1942. (C)

46. Orthopedics (Gr. orthós, straight + paîs, child.)

Adolescent Spondylitis, *Scott, S. Gilbert, M.D.* Oxford University Press, New York, 1942, 132 pages.

A monograph published under the auspices of the Nuffield Wide-Field X-ray Therapy Research on early diagnosis and treatment by wide-field x-ray irradiation. Records, investigations, extending over a period of ten years, which have enabled the clinical diagnosis to be made some five years before the onset of spinal symptoms. The author claims it is not a rare disease but is frequently unrecognized until the very late stages. There is a tendency to spondylitis in athletes. The whole problem is of considerable pediatric-orthopedic interest during all the adolescent years, and one should be familiar with the early symptoms. The author's ideas are individual and impressive. (C)

*See Current Pediatric Literature, 1941-1942, J. PEDIAT. 21: (Part II): 33, 1942.

The Human Foot, *Morton, Dudley J., M.D.* Columbia University Press, New York, 1935, 244 pages.

Devotes an unusual amount of space to the development and physiology of the foot for a thorough understanding of the evidence on which one can identify and analyze the primary factors of functional disorders of the foot. Consequently, the book is of continued interest and value to the pediatrician. (E)

The Crippled Child (Journal), *Hackett, Vivian M., Editor.* National Society for Crippled Children, Inc., Elyria, Ohio.

Articles, news, book reviews. Current volume, 21. Bimonthly. (C)

47. Otorhinology (Gr. otós, ear + rhinós, nose + logos, q.v.)

Nasal Sinuses, *Van Alyea, O. E., M.D.* Williams & Wilkins Co., Baltimore, 1942, 262 pages.

Describes the individual sinus areas with considerable emphasis on origin and development, anatomic, and histopathologic relations. Important chapters on acute nasal infections, sinus disease in children, allergy, the relation of sinuses to other organs and some surgical therapeutic measures. J. PEDIAT. **22**: 758, 1943; Brit. M. J. **1**: 163, 1943. (E)

Nasal Medication, *Fabricant, Noah D., M.D.* Williams & Wilkins Co., Baltimore, 1942, 122 pages.

Special stress has been placed on physiology and histopathology. Of unusual importance to the pediatrician. A companion piece to *Nasal Sinuses* by Van Alyea. J. PEDIAT. **23**: 129, 1943; J. A. M. A. **121**: 470, 1943. (E)

48. Parasitology (Gr. para, beside + sîtos, food + logos, q.v.)

Textbook of Clinical Parasitology, *Belding, David L., M.D.* D. Appleton-Century Co., Inc., New York, 1942, 888 pages.

The present war focuses attention on the control of parasitic diseases among military forces and civilian populations in the tropic and subtropic countries of the Eastern and Western Hemispheres. Likewise, geographic barriers are being swept away by the intermingling of populations through modern transportation, and tropic as well as cosmopolitan parasites present clinical and public health problems in all parts of the world. The book describes the protozoan, helminthic, and arthropod parasites of man, and the diagnosis, treatment, and prevention of the diseases they produce. Used extensively are tables and graphic representations that facilitate study and access to information. Discusses immunity to parasitic infestations; and includes a special section on technical methods for laboratory workers. Am. J. Dis. Child. **64**: 573, 1942; J. A. M. A. **119**: 1232, 1942; Bull. Johns Hopkins Hosp. **71**: 249, 1943. (E)

Clinical Parasitology,* *Craig, Charles Franklin, M.D., and Faust, Ernest Carroll, Ph.D.* Lea & Febiger, Philadelphia, ed. 3, 1943, 767 pages.

Presents only the more limited field of parasitology of animal parasites which infect or infest the host or serve as transmitters of pathogenic organisms to man.

*See Current Pediatric Literature, 1940-1941, J. PEDIAT. **19**: (Part II): 27, 1941.

Gives the essential facts, especially the epidemiologic and clinical information in the field of human parasitology, including the diseases transmitted to man by arthropods. (C)

49. Pathology (Gr. pathós, disease + logos, q.v.)

Human Pathology, *Karsner, Howard T., M.D.* J. B. Lippincott Co., Philadelphia, ed. 6, 1942, 817 pages.

A textbook of pathology should not be a mere catalogue of morbid anatomy. A knowledge of morphologic changes is fundamental to a comprehension of the subject but must be expanded by a coordination of the physiologic and biochemical implications of altered structure. Furthermore, the functional disturbances should be interpreted in terms of clinical manifestations. To this end, disease and its effects in the living patient have been correlated as closely as is consistent with the primary objectives of the book. J. A. M. A. **121:** 549, 1943; Am. J. M. Sc. **204:** 756, 1942; Bull. Johns Hopkins Hosp. **72:** 373, 1943. (E)

Essentials of Pathology, *Smith, Lawrence W., M.D., and Gault, Edwin S., M.D.* D. Appleton-Century Co., Inc., New York, ed. 2, 1942, 904 pages.

Offers a thorough discussion of the fundamental principles of pathology which are practical and essential. The pathology of parasitic infestations is given more than the usual amount of attention. Tumors are likewise emphasized to a greater extent than is customary. The teaching of pathology should be undertaken in an attempt to correlate the underlying pathologic processes on the one hand and the visible evidence of disease on the other. To this end, the case history method of presentation has been adopted. The first thirteen chapters have been completely rewritten to include a full discussion of pathologic principles and the mechanism thereof as well as the more objective gross and microscopic detail. A brief bibliography has been added for each chapter. Bull. Johns Hopkins Hosp. **71:** 380, 1942; Brit. M. J. **2:** 107, 1943. (C)

Text-Book of Pathology, *Boyd, William, M.D.* Lea & Febiger, Philadelphia, ed. 4, 1943, 1,008 pages.

A standard text for students brought up to date with new additions and the rewriting and revision of many sections. Am. J. M. Sc. **206:** 133, 1943. (C)

American Journal of Pathology, *Weller, Carl V., M.D., Editor.* Ann Arbor, Mich.

For the American Association of Pathologists and Bacteriologists. Original articles, abstracts. Current volume, 19. Bimonthly. (C)

Archives of Pathology (Journal), *Hektoen, Ludwig, M.D., Chief Editor.* American Medical Association Press, Chicago.

Original articles, case reports, proceedings, abstracts, news, book reviews. Current volume, 37. Monthly. (C)

American Journal of Clinical Pathology, *Davidson, I., M.D., Editor.* Williams & Wilkins Co., Baltimore.

For the American Society of Clinical Pathologists. Original articles, news and notes, book reviews. Current volume, 13. Monthly. (C)

50. Pediatric Texts (Gr. paîs, paidos, boy, child + iatrikos, art of healing.) Treats of the hygiene and diseases of children.

Holt's Diseases of Infancy and Childhood, *Holt, L. Emmett, Jr., M.D., and McIntosh, Rustin, M.D.* D. Appleton-Century Co., Inc., New York, ed. 11, 1940, 1,421 pages.

The best book in any field of medicine. Sections by many authors from the group associated with the principal authors. Am. Dis. Child. **61:** 203, 1941; J. A. M. A. **116:** 262, 1941. (E)

Management of the Sick Infant and Child, *Porter, Langley, M.D., and Carter, William E., M.D.* The C. V. Mosby Co., St. Louis, ed. 6, 1942, 977 pages.

Assesses the value of many ideas of new knowledge for the physician who is responsible for the management of sick infants and children and organizes and presents this new knowledge in the form of useful clinical advice as well as practical technical procedures. J. A. M. A. **122:** 142, 1943; Brit. M. J. **2:** 514, 1942. (E)

Practice of Pediatrics, *Brennemann, Joseph, M.D., Editor in Chief.* W. F. Prior Co., Inc., Hagerstown, Md., 1933, 4 vols.

A system of pediatrics by many authors, kept abreast of a rapidly changing clinical field by current additions to the text. (C)

51. Pediatric Journals

Journal of Pediatrics, *Veeder, Borden S., M.D., and McCulloch, Hugh, M.D., Editors.* The C. V. Mosby Co., St. Louis.

For the American Academy of Pediatrics. Original articles, Academy proceedings, critical reviews, news, comments, book reviews. Current volume, 23. Monthly. (E)

American Journal of Diseases of Children, *Grulee, Clifford G., M.D., Editor.* American Medical Association Press, Chicago.

Original articles, progress in pediatrics, current abstracts, proceedings, news, book reviews. Current volume, 66. Monthly. (E)

Foreign

International

Annales Paediatrici (Journal), *Freudenberg, E., Redactor.* S. Karger, New York and Basel.

International Review of Pediatrics. Continuation of Jahrbuch für Kinderheilkunde. Original articles only, in English, German, and French. Inactive. Bimonthly. (C)

Great Britain

Archives of Disease in Childhood (Journal), *Moncrieff, Alan, M.D., and Ellis, Richard W. B., M.D., Editors.* British Medical Association House, London.

Original articles, proceedings. Current volume, 18. Quarterly. (C)

British Journal of Children's Diseases, *Rolleston, J. D., M.D., Editor.* Adlard & Son, London.

Original articles, proceedings, correspondence, abstracts, reviews. Current volume, 40. Quarterly. (C)

Cuba

Archivos de medicina infantil (Journal), *Inclan, Clemente, Director.* Havana. Original articles, abstracts, notices. Current volume, 12. Quarterly.

Boletín de la Sociedad cubana de pediatría (Journal), *Aballi, Angel Arturo, and Hurtado, Felix, Directors.* Havana.

For the Cátedra de Patología y Clínica Infantiles Hospital "Mercedes." Original articles only. Current volume, 15. Monthly.

Mexico

Pediatría de las Americas, *Alarcón, Alfonso G., Compilator.*

Encyclopedic collection of studies of diseases of children, with the collaboration of other pediatricians of continental America, in Spanish. Current volume, 1. Monthly.

Revista mexicana de pediatría (Journal), *Alarcón, Alfonso G., Director.* Mexico, D.F.

For the Mexican Society of Pediatrics. Original articles, notices, book reviews. Current volume, 13. Monthly.

Argentina

Archivos argentinos de pediatría (Journal), *Garrahan, Juan P., Director.* Buenos Aires.

For the Argentine Society of Pediatrics. Original articles, book reviews, abstracts, chronicles. Current volume, 19. Monthly.

Revista de pediologia (Journal), *Siri, Luis, Director.* Buenos Aires. Original articles, book reviews, abstracts. Current volume, 5. Quarterly.

Brazil

Jornal de pediatría (Journal), *da Rocha, José Martinho, Director.* Rio de Janeiro.

For the Brazilian Society of Pediatrics. Original articles, proceedings, book reviews. In Portuguese. Current volume, 9. Monthly.

Chile

Revista chilena de pediatría (Journal), *Alvarez, Gustavo Garcia, Director.* Santiago.

For the Chilean Society of Pediatrics. Original articles, book reviews, chronicles, transactions. Current volume, 14. Monthly.

Archivos del Hospital de niños Roberto del Rio (Journal), *Scroggie, A., Director.* Santiago.

Original articles. Current volume, 11. Quarterly.

Colombia

Revista columbiana de pediatría y puericultura (Journal), *Bejarano, Jorge, Director.* Bogotá.

For the Pediatric Society of Bogotá. Original articles, proceedings, book reviews, abstracts. Current volume, 2. Bimonthly.

Peru

Revista Peruana de Pediatría, *Krumdieck, Carlos J., Director.* Lima.

For the Peruvian Society of Pediatrics. Quarterly.

Uruguay

Archivos de pediatría del Uruguay (Journal), *Pelfort, Conrado, Director.* Montevideo.

For the Uruguayan Society of Pediatrics. Original articles (summaries in English), proceedings, abstracts, notes. Current volume, 14. Monthly.

Boletin del Instituto internacional americano de protección a la infancia (Journal), *Berro, Roberto, Director.* Montevideo.

Original articles (summaries in English), proceedings, book reviews, abstracts, information. Current volume, 17. Quarterly.

India

Indian Journal of Pediatrics, *Chaudhuri, K. C., Editor.* S. C. Sarkar & Lois, Ltd., Calcutta.

Original articles, proceedings, abstracts, in English. Current volume, 10. Quarterly.

The Netherlands

Maandschrift voor kindergeneeskunde (Journal), *Gorter, E., Director.* H. E. Stenfert Kroese's Uitgevers-Maatschappij n. v., Leiden.

Original articles only (summaries in English). Inactive. Monthly.

Sweden

Acta paediatrica (Journal), *Jundell, I., Editor.* Almquist & Wiksells, Uppsala.

Original articles in English, German, and French only (summaries in English). Inactive.

52. Pharmacology (Gr. phármakon, drug + logos, q.v.)

A Manual of Pharmacology, *Sollmann, Torald, M.D.* W. B. Saunders Co., ed. 6, 1942, 1,298 pages.

Aims to furnish a rather comprehensive outline of current knowledge and conceptions of drug actions, especially from the point of view of their practical importance in medicine, therapeutics, and toxicology. Aside from the spectacular and outstanding advances in the special fields, there have been rather quiet developments in nearly all aspects of medicine which have become so extensive as to require complete revision of this book. J. A. M. A. **119:** 600, 1942; Arch. Int. Med. **70:** 172, 1942. (C)

The Pharmacological Basis of Therapeutics, *Goodman, Louis S., M.D., and Gilman, Alfred, Ph.D.* The Macmillan Co., New York, 1941, 1,382 pages.

Three objectives have guided the writing of this book: the correlation of pharmacology with related medical sciences, the reinterpretation of the actions and uses of drugs from the viewpoint of important advances in medicine, and the placing of emphasis on the application of pharmacodynamics to therapeutics. Offers an opportunity to the practicing physician to keep abreast of recent advances in therapeutics and to acquire principles necessary for the rational use of drugs. J. A. M. A. **116:** 1991, 1941. (E)

CONTENTS: Central nervous system depressants. Central nervous system stimulants. Local anesthetics. Drugs acting on autonomic effector cells. Cardiovascular drugs. Water, salts, and ions. Drugs affecting urine formation. Drugs acting on the reproductive organs. Gases and vapors. Heavy metals and metalloids. Drugs acting locally on the skin and mucous membranes. Antiseptics, disinfectants, and drugs used in the chemotherapy of infectious diseases. Drugs acting locally on blood and blood-forming organs. Drugs of endocrine origin. Vitamins. Principles of prescription writing.

The Pharmacopeia of the United States of America, Twelfth Revision. United States Pharmacopeial Convention, Inc., 1942, 880 pages.

Prepared by the Committee of Revision, 1940-1950, E. Fullerton Cook, Chairman. There is still a need for reference to a standard yardstick for proper therapeutic agents. J. PEDIAT. **21:** 567, 1942; J. A. M. A. **120:** 993, 1942; Am. J. M. Sc. **204:** 744, 1942. (C)

CONTENTS: History of pharmacopeia. Proceedings of the Convention of 1940. General notices. Monographs on vegetable and animal drugs, chemicals, and preparations. General tests, processes, and apparatus. Reagents, test solutions, indicators, standard solutions, and hydrogen ions. Tables.

The National Formulary. American Pharmaceutical Association, Washington, D. C., ed. 7, 1942, 690 pages.

Revised by the Committee on National Formulary, Powers, Justin L., Ph.D., Chairman, under the direct authority and supervision of the Council of the American Pharmaceutical Association after a period of only six years. J. PEDIAT. **21:** 433, 1942; J. A. M. A. **120:** 572, 1942; Am. J. M. Sc. **204:** 597, 1942. (C)

CONTENTS: Monographs on drugs, chemicals, and preparations. Reagents and preparations for use in clinical laboratory. Ingredients of reagents and preparation for use in clinical laboratory. General tests, processes, and apparatus. History of National Formulary.

Epitome of the Pharmacopeia of the United States and the National Formulary With Comments. American Medical Association Press, Chicago, ed. 7, 1943, 271 pages.

It is considered essential that physicians be informed as to the nature of the remedies which are included in the Pharmacopeia of the United States and the

National Formulary. Since these two books contain much technical information of little value to the physician, the Council on Pharmacy and Chemistry has authorized the publication of this epitome of the information contained in the two books which is useful to the physician, including also statements of the actions and uses of the drugs described. (E)

Annual Reprint of the Reports of the Council on Pharmacy and Chemistry. American Medical Association Press, Chicago, 1943, 207 pages.

Contains reports of the Council adopted and authorized for publication during 1942, as well as reports of lesser importance which were not published. J. A. M. A. **123:** 178, 1943. (C)

53. Physical Diagnosis

Diseases of the Chest and Principles of Physical Diagnosis, *Norris, George W., M.D., and Landis, H. R. M., M.D.* W. B. Saunders Co., Philadelphia, ed. 6, 1938, 1,019 pages. (C)

The text on principles of physical diagnosis is a most important reference; the presentation of diseases of the chest, meaning the heart and lungs, being less satisfactory than that found in the better pediatric books. (E)

54. Physiology (Gr. physis, growth + logos, q.v.)

The Physiological Basis of Medical Practice,* *Best, Charles Herbert, M.D., and Taylor, Norman Burke, M.D.* Williams & Wilkins Co., Baltimore, ed. 3, 1943, 1,942 pages.

Many alterations, additions, and deletions have been made throughout in an attempt to bring the book up to date. Serves to link the laboratory and the clinic and should promote continuity of physiologic teaching and principles with clinical practice. The most important book available in this field and indispensable. Am. J. M. Sc. **206:** 140, 1943; Canad. M. A. J. **49:** 156, 1943. (E)

Starling's Principles of Human Physiology, *Evans, C. Lovatt, F.R.S.* Lea & Febiger, Philadelphia, ed. 8, 1941, 1,247 pages.

"Starling's Principles" has always been the viewpoint of the scientific rather than the clinical. There has been considerable change in the section dealing with the central nervous system, also an extensive revision of that part dealing with reproduction, hormones and vitamins, urinary secretion, and those numerous parts of physiology which are mainly biochemical. J. A. M. A. **121:** 550, 1943; Am. J. M. Sc. **205:** 431, 1943. (C)

Physiological Reviews (Journal), *Hooker, Donald R., M.D., Managing Editor.* Baltimore.

For the American Physiological Society. To provide a concise but comprehensive review of the recent literature and to present the status of various subjects in physiology, using this term in a broad sense to include biochemistry, biophysics, experimental pharmacology, and experimental pathology. Current volume, 23. Quarterly. (C)

*See Current Pediatric Literature, 1940-1941, J. PEDIAT. **19** (Part II): 23, 1941.

American Journal of Physiology, *Hooker, Donald R., M.D., Managing Editor.* Baltimore.

For the American Physiological Society. Original articles only, proceedings. Current volume, 139. Monthly.

55. Psychiatrics (Gr. psyché, mind + iatricos, the art of healing.)

Child Psychiatry, *Kanner, Leo, M.D.* Charles C Thomas, Springfield, Ill., 1935, 527 pages.

Covers the entire field of children's personality disorders on a broad, objective, unbiased, and practical basis. (E)

CONTENTS: Basic principles. Examination and diagnosis. Principles and aims of psychiatric treatment. Personality difficulties forming essential features or sequels of physical illness. Personality difficulties expressing themselves in form of involuntary part-dysfunctions of the individual.

Outline of Psychiatric Case Study, *Preu, Paul William, M.D.* Paul B. Hoeber, Inc., New York, ed. 2, 1943, 279 pages.

A special outline for the psychiatric case study of the child has been prepared in full detail so that it may be used entirely independently of the one for adults. Deals primarily with the problems of adjustment of the school child and adolescent. The purely developmental problems of infancy and early childhood are touched on only incidentally, since these are, at the present time, at least, outside the field of psychiatrics. J. PEDIAT. **22:** 510, 1943; J. A. M. A. **122:** 142, 1943; Am. J. M. Sc. **205:** 595, 1943. (E)

American Journal of Orthopsychiatry, *Lowrey, Lawson G., M.D., Editor.* New York.

For the American Orthopsychiatric Association. Original articles, comments, news, book reviews. Current volume, 13. Quarterly. (C)

56. Psychology (Gr. psyché, mind + logos, q.v.)

In Defense of Children, *Beverly, Bert I., M.D.* The John Day Co., Inc., New York, 1941, 233 pages.

The parent who is uncertain as to how to handle a given situation will be best advised to do nothing at all: A child left alone to work out his own problems will probably solve them better than his elders could. *In Defense of Children,* therefore, reveals a wholesome faith in the child's human nature. J. PEDIAT. **19:** 872, 1941; Am. J. Dis. Child. **63:** 630, 1942. (E)

CONTENTS: Children are seen through dark glasses. Roads of destiny. Shades of the prison house. Children are what parents make them. Thorns in the midst. Cultivating natural abilities. Roots of conflict. Developing sovereign power. The dark tower. The valley of confusion. We look before and after.

In Defense of Mothers, *Kanner, Leo, M.D.* Dodd, Mead & Co., New York, 1941, 167 pages.

How to bring up children in spite of the more zealous psychologists. "Going forward with common sense." Answers the more recurrent almost stereotyped

questions asked by parents, the truth being told laughingly. J. PEDIAT. **19:** 873, 1941. (E)

CONTENTS: An open letter to contemporary mothers. The devil on the wall. Prevention which does not prevent. Democracy begins at home. Mother love and smother love. Where carping censors lurk. Superstitions—old and new. The truth is not a pompous bigot. Their daily bread. Aches and pains. Libeling labels. The fidgets. Thumbsucking. The great god unconscious. This what's-it called sex education. Through no fault of man. Portrait of a good mother.

Feeding Our Old-Fashioned Children, *Aldrich, C. Anderson, M.D., and Aldrich, Mary M.* The Macmillan Co., New York, 1941, 112 pages.

Originally intended for a third edition of *Cultivating the Child's Appetite.* An entirely new manuscript was gradually developed as a result of changes in the authors' views and in the controversial subject. The direction of thought is toward the children who do the feeding rather than the absorption in food. J. PEDIAT. **18:** 705, 1941; Am. J. Dis. Child. **61:** 1351, 1941; J. A. M. A. **117:** 575, 1941. (E)

CONTENTS: The problem. Eating begins. The carburetor. Moving parts. Where do the parents come in? Bridging the gap. Following physiologic clues. Defining nutritional standards. Routines to fit the child. Appetite, the weapon. Treatment of the established case.

Psychologic Care During Infancy and Childhood, *Bakwin, Ruth Morris, M.D., and Bakwin, Harry, M.D.* D. Appleton-Century Co., Inc., New York, 1942, 317 pages.

Designed primarily to interest the physician in the promotion of optimal psychologic health in the child. Written also for nurses and social workers. Emphasizes the field of prevention and the training of the normal child in the right direction rather than the correction of defects. J. PEDIAT. **21:** 429, 1942; Am. J. Dis. Child. **64:** 575, 1942. (C)

Psychotherapy With Children, *Allen, Frederick H., M.D.* W. W. Norton & Co., Inc., New York, 1942, 311 pages.

The theme is that children with personality and behavior difficulties can be helped to help themselves. The book is a contribution in the nature and processes of therapeutic work with children and parents. The material should prove helpful in broadening the understanding of difficulties for pediatricians, teachers, and other professional groups. Some intelligent parents may also add to their own knowledge and understanding. The major emphasis is on the participation of the child in the therapeutic process, leaving aside temporarily the part played by parent education. J. PEDIAT. **21:** 568, 1942. (E)

CONTENTS: Normal psychologic growth process. Function of the family in the child's growth. Therapeutic process. Beginning phase of therapy. Child's participation. A fearful child in therapy: a case history. Problems arising in working with aggressive behavior. Factors that interfere with therapy. Ending phase of therapy. Broader implications of therapeutic philosophy.

Reading, Writing and Speech Problems in Children, *Orton, Samuel Torrey, M.D.* W. W. Norton & Co., Inc., 1937, 215 pages.

Since the disorder in the normal acquisition of spoken or written language serves as a severe hindrance to academic advancement and often lies at the root of serious emotional disturbances, the studies here recorded may prove of interest to teachers and parents as well as physicians. This presentation has been simplified in so far as its contents would permit. (E)

CONTENTS: Language losses in the adult as the key to the developmental disorders in children. Certain disorders in the development of language in children. Interpretation and treatment of certain disorders of language in children.

An Introduction to Group Therapy, *Slavson, S. R.* Commonwealth Fund, New York, 1943, 352 pages.

Deals with a method of psychotherapy employed by the Jewish Board of Guardians of New York and known as group therapy, along with psychiatric case work, psychologic, and diagnostic services. J. A. M. A. **123:** 123, 1943. (C)

CONTENTS: Principles and practice. Choice of clientele. Problem of grouping. Function of the adult. The therapeutic process. Typical cases. Variations in group treatment. Outline for a referral summary, progress report, integration, conference, and follow-up study.

The Nervous Child (Journal), *Harms, Ernest, Editor.* Grune & Stratton, Inc., New York.

An independent journal, aiming to further the progress in any type of study and care of nervous and mentally diseased children. Offered as a clearing house for all organizations working in the field of mental hygiene and guidance of the child. Original articles, editorials, book reviews, notices. Current volume, 3. Quarterly. (C)

57. Public Health

Hospital Discharge Study. Vol. I. Hospitals and Hospital Patients in New York City, 1942, 209 pages. **Vol. II. Hospitalized Illness in New York City, 1943,** 349 pages. *Deardorff, Neva R., Ph.D., and Fraenkel, Marta, M.D.* Welfare Council of New York City.

This study of patients discharged from hospitals in 1933 in New York City was undertaken as a demonstration of the feasibility and value of collecting statistics about hospitalized morbidity. Vol. I is devoted to the analysis of the general demographic and public health aspects. Vol. II is devoted to the medical aspects. (C)

Hygeia (Journal), *Fishbein, Morris, M.D., Editor.* American Medical Association Press, Chicago.

Health magazine of the American Medical Association. Current volume, 21. Monthly. (E)

The Child (Journal). Department of Labor, Children's Bureau, Division of Public Documents, U. S. Government Printing Office, Washington, D. C.

Meets the need for an exchange of information between the Children's Bureau and the various agencies actively engaged in furthering the interests of children. Contains articles, brief reports, news items, and reviews of new publications relating to current developments in the fields of child health, child welfare, the prevention of delinquency, and the employment of minors in the United States. Current volume, 8. Monthly. (E)

Public Health Reports (Journal). Federal Security Agency, Public Health Service, Division of Public Documents, U. S. Government Printing Office, Washington, D. C.

Contains current information regarding the prevalence and geographic distribution of communicable diseases in the United States, in so far as data are available and of other important communicable diseases throughout the world; articles re-

lating the cause, prevention, and control of disease; and other pertinent information regarding sanitation and the conservation of public health. Current volume, 58. Weekly. (C)

American Journal of Public Health, *Mustard, H. S., M.D., Editor.* American Public Health Association, New York.

For the American Public Health Association. Original articles, editorials, book reviews, news. Current volume, 33. Monthly. (C)

58. Radiology (L. radius, ray + Gr. logos, q.v.)

Outline of Roentgen Diagnosis, *Rigler, Leo G., M.D.* J. B. Lippincott Co., ed. 2, 1943, 196 pages.

An outline for the orientation and teaching of roentgen diagnosis. Newer procedures as well as recognition of certain new syndromes have been included in the text. Discussions of the technic and value of fluoroscopy and of the dangers incident to roentgen examination have been added. A large portion of the book is a pictorial atlas presenting roentgenograms, teaching drawings, and schematic diagrams. J. A. M. A. **122:** 1057, 1943. (E)

59. School Health

Solving School Health Problems, *Nyswander, Dorothy B., Ph.D.* Commonwealth Fund, New York, 1942, 377 pages.

Presents the outcome and details of the four-year extensive Astoria Demonstration Study of school health service in New York City. A culmination of a number of studies which bear definite relation to each other in continuity of interest, sponsorship, and personnel. A critical analysis of school health service as it is with suggestions for improvement. Am. J. Dis. Child. **64:** 960, 1942; J. A. M. A. **120:** 800, 1942; Am. J. M. Sc. **204:** 590, 1942; Am. Rev. Tuberc. **47:** 226, 1943. (E)

CONTENTS: Plan of the Astoria Study. The school physician and his job. Findings and follow-up for the entering group and the specially referred group. Teacher participation. Educational opportunities of the nurse. Referrals by the teacher as part of the nurse's case load. Keeping school medical records alive. Testing visual acuity. Testing for loss of hearing. Obtaining dental care. Care of the cardiac child. Private physicians and the school health program. Ventures in staff education. Serving the school child.

Health in Schools. National Education Association, Washington, D. C., 1942, 544 pages.

The twentieth yearbook of the American Association of School Administrators, a department of the National Education Association. A statement of the administrators' role in the school program of health education. Am. J. Dis. Child. **63:** 1009, 1942. (E)

CONTENTS: A point of view on health education. Organization and administration of the general program. Health instruction in related areas. Health aspects of physical education and recreation. Mental hygiene in the school program. School programs for physically exceptional children. Communicable disease: general control measures, types and specific controls. Injuries and emergency illness. Healthful school environment. Functions and preparation of school health personnel. Administrative practices affecting the health of school personnel. Coordination of health agencies. Legislative and legal aspects of the school health program. Questions regarding school health problems.

60. Social Hygiene. Deals with the development and preservation of healthy relations and institutions involved in man's existence and well-being as a member of society.

Journal of Social Hygiene, *Winslow, C. E. A., M.D., Chairman, Editorial Board.* American Social Hygiene Association, New York.

Original articles, notes, book reviews. Current volume, 29. Nine issues annually. (C)

61. Surgery (OF. cirurgerie.)

Surgical Physiology, *Nash, Joseph, M.D.* Charles C Thomas, Springfield, Ill., 1942, 496 pages.

The basic physiologic processes that are involved in the practice of surgery are presented from the viewpoint of the surgeon. Operative technics are only the apex of the great pyramid of surgical knowledge and somewhere below that apex, the pediatrician has his place. J. A. M. A. **119**: 1466, 1942. (C)

Abdominal Surgery in Infancy and Childhood, *Ladd, William E., M.D., and Gross, Robert E., M.D.* W. B. Saunders Co., Philadelphia, 1941, 455 pages.

The details of pre- and postoperative care and of operative technics, and a statistical portrayal of experiences which have accumulated during the past twenty-five years are given. Sets forth personal observations and practices for those who must diagnose and treat abdominal conditions in infancy and childhood. J. PEDIAT. **20**: 535, 1942; Am. J. Dis. Child. **62**: 1330, 1941; J. A. M. A. **117**: 2110, 1941. (E)

Intestinal Obstructions, *Wangensteen, Owen H., M.D.* Charles C Thomas, Springfield, Ill., ed. 2, 1942, 484 pages.

A physiologic and clinical consideration with emphasis on therapy; including description of operative procedures. After an experience now of more than ten years with conservative decompression—a method which has exerted, apparently, a materially favorable influence upon the mortality of intestinal obstruction, the writer feels that further general decrease of the risks of obstruction will come about, largely, through improvements in dealing with obstructed patients surgically. With that consideration in mind, and mindful also of the shortcomings of the suction method, great pains have been taken to attempt to describe, more adequately, satisfactory surgical procedures in the management of intestinal obstruction.

In this edition an attempt has been made to secure a more even balance between operative and nonoperative forms of treatment. Intestinal intubation with the Miller-Abbot tube, a technic developed since the publication of the first edition, is described. Arch. Int. Med. **71**: 439, 1943; Canad. M. A. J. **47**: 504, 1942; Brit. M. J. **2**: 696, 1942. (C)

CONTENTS: Special chapters of interest in the pediatric field are: Congenital atresia of the intestine. Imperforate anus. Intestinal obstruction due to adhesions and bands. Intestinal obstruction due to internal hernia. Volvulus. Intussusception. Errors in development of the intestine giving rise to intestinal obstruction (other than congenital stenosis).

Surgery of the Ambulatory Patient, *Ferguson, L. Kraeer, M.D.* J. B. Lippincott Co., 1942, 923 pages.

Discusses the lesions which are not seen regularly in an office or outpatient clinic and describes the best methods of treating them.

The book is divided into three parts. The first part, of interest to medical practitioners and pediatricians, is a general discussion of typical lesions and general principles involved, including a survey of the field of ambulatory surgery, anesthesia, preparation for, and conduct of operations, postoperative care, dressings and bandages, treatment of inflammation due to infection, special surgical lesions, open wounds, burns and frost bite, and foreign bodies. These are all proper subjects for pediatricians to be concerned with and where the pediatrician can be of assistance to the surgeon.

The second part of the book is on regional surgery describing the common surgical lesions of the specific parts and the methods of treatment. This section is more surgical and less pediatric. The third section deals with fractures and dislocation, and their treatment. Here again there is a distinct relation to pediatrics. Brit. M. J. 2: 368, 1942. (C)

Minor Surgery, *Christopher, Frederick, M.D.* W. B. Saunders Co., Philadelphia, ed. 4, 1942, 990 pages.

The practice of minor surgery requires a broad general knowledge of surgical diagnosis, the ability to differentiate the major surgical conditions from the minor ones. All minor surgery is potentially major surgery. Considerable knowledge, judgment, and skill are needed for the solution of many of the problems. These same problems confront the pediatrician, and while he may not practice minor surgery, he too must exercise the same knowledge and judgment required of the surgeon. (C)

62. Therapeutics (Gr. therapéia, treatment.)

Useful Drugs, *Hatcher, Robert A., M.D., Editor.* American Medical Association Press, Chicago, ed. 13, 1942, 306 pages.

For the Council on Pharmacy and Chemistry. A selected list of essential drugs with brief discussions of actions, uses and dosage. This book needs no introduction nor explanation. It is one of the indispensables, which is well verified by the frequency and number of editions. This edition is especially important since it is based on the new (twelfth) revision of the Pharmacopoeia and the new (seventh) edition of the National Formulary. (E)

New and Nonofficial Remedies, 1943, *Smith, Austin E., Editor.* American Medical Association Press, Chicago, 1943, 772 pages.

Containing descriptions of the articles that stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on Jan. 1, 1943. J. A. M. A. 122: 1213, 1943. (E)

Manual of Oxygen Therapy Techniques, *Andrews, Albert H., Jr., M.D.* The Year Book Publishers, Inc., Chicago, 1943, 191 pages.

Correct administration of oxygen therapy requires attention to many details. Dosage is basically a matter of achieving an effective oxygen concentration in the lungs. Although it is impossible to separate oxygen flows entirely from con-

centrations, it is essential always to bear in mind that a given flow can result in a given concentration only if certain absolute conditions of technique are fulfilled.

The gases discussed are oxygen, carbon dioxide, helium, and water vapor. The equipment for their administration is described and the care of such equipment is discussed. J. PEDIAT. **22**: 570, 1943; J. A. M. A. **121**: 1183, 1943; Arch. Int. Med. **71**: 441, 1943; Brit. M. J. **2**: 76, 1943. (C)

63. Tuberculosis (L. tuberculum, a small rounded morbid growth in the body.)

The Modern Attack on Tuberculosis, *Chadwick, Henry D., M.D., and Pope, Alton S., M.D.* Commonwealth Fund, New York, 1942, 95 pages.

Discusses the current problems in tuberculosis control and the operation of an effective regional control program. Emphasizes the discovery and control of the disease by age, sex, occupation, and within the family, and the function of the sanatorium. J. PEDIAT. **21**: 288, 1942; J. A. M. A. **120**: 489, 1942; Am. J. M. Sc. **204**: 589, 1942. (C)

CONTENTS: Tuberculosis yesterday and today. Epidemiologic aspects of the disease. Diagnostic procedures. The sanatorium as a means of control and treatment. Case finding in the community. A community campaign of eradication.

Diagnostic Standards and Classification of Tuberculosis, *Heise, Fred H., M.D., Chairman.* National Tuberculosis Association, New York, 1940, 32 pages.

Prepared by the Committee on Diagnostic Standards for the National Tuberculosis Association and the American Trudeau Society. Brings *Diagnostic Standards* through periodic revision into line with current thought. It is a statement of principles and a general guide to be used as presented or with modifications. Will serve best to promote common understanding on the basis of familiar terminology and conceptions. (E)

Chest X-Ray Interpretation With Special Reference to Tuberculosis, *Amberson, J. Burns, Jr., M.D.* National Tuberculosis Association, New York, 1941, 48 pages.

The physician who is familiar with the clinical features of a case is in the best position to appreciate and apply x-ray findings and, if possible, he should always make his own interpretations or consult with the expert roentgenologist who is doing so. The interpretation of the roentgenographic appearance of the healthy chest is fundamentally important. (E)

American Review of Tuberculosis (Journal), *Pinner, Max, M.D., Editor.* Williams & Wilkins Co., Baltimore.

For the National Tuberculosis Association and the American Trudeau Society. Original articles, abstracts. Current volume, 48. Monthly. (E)

64. United States Government

Selected List of Publications, October 1943. Department of Labor, Children's Bureau, Division of Public Documents, U. S. Government Printing Office, Washington, D. C.

1. **The Road to Good Nutrition,** *Roberts, Lydia J.* Publication No. 270, 1942, 54 pages.

2. **White House Conference on Children in a Democracy,** Final Report, Publication No. 272, 1942, 392 pages.
3. **Food for Young Children in Group Care,** *Lowenberg, Miriam E.* Publication No. 285, 1942, 34 pages.
4. **Standards of Child Health, Education, and Social Welfare,** Publication No. 287, 1942, 21 pages.
5. **Births, Infant Mortality, Maternal Mortality, 1940.** Graphic Presentation, Publication No. 288, 1942.
6. **Wartime Employment of Boys and Girls Under 18,** Publication 289, 1943, 16 pages.
7. **Guides to Successful Employment of Non-Farm Youth in Wartime Agriculture,** Publication No. 290, 1943, 14 pages.
8. **Protecting the Health of Young Workers in Wartime,** Publication No. 291, 1943, 10 pages.
9. **Standards and Recommendation for Hospital Care of Newborn Infants, Full Time and Premature,** Publication No. 292, 1943, 14 pages.
10. **Facts About Crippled Children,** Publication No. 293, 1943, 14 pages.
11. **Facts About Child Health,** Publication No. 294, 1943, 16 pages.
12. **Community Action for Children in Wartime,** Publication No. 295, 1943, 9 pages.
13. **Supervised Homemaker Service,** Publication No. 296, 1943, 36 pages.

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American Association for Advancement of Science, Smithsonian Institute Bldg. (25), Washington, D. C., 584

American Dental Association, 222 E. Superior St. (11), Chicago, 591

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